VAX/VMS Backup Utility Reference Manual

Order Number: AA–Z407B–TE

April 1986

This document describes the Backup Utility program for use on VAX processors.

Revision/Update Information:	This document supersedes the *VAX/VMS Backup Utility Reference Manual* Version 4.0
Software Version:	VAX/VMS Version 4.4

digital equipment corporation
maynard, massachusetts

April 1986

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Preface

Intended Audience

This document is intended for many levels of users; it assumes, however, that the reader has a fundamental knowledge of the DIGITAL Command Language (DCL).

As this document intends to serve a wide range of users, please make use of the Reader's Comment form at the back of the manual if you have any suggestions for how it can be improved.

Structure of This Document

This document is composed of four major sections.

The Format Section is an overview of the Backup Utility and is intended as a quick reference guide. The format summary contains the DCL command that invokes BACKUP, listing all command and positional qualifiers and parameters. The usage summary describes how to invoke and exit from the Backup Utility, how to direct output, and any restrictions you should be aware of.

The Description Section explains how to use BACKUP. It includes a section called "Using BACKUP: A Guide for New Users" that explains BACKUP to inexperienced users. If you are using BACKUP for the first time, or if you use BACKUP infrequently, begin by reading the guide and then refer to other sections of the manual for more detailed information.

The Qualifier Section consists of five parts: BACKUP Command Qualifiers, Input File-Selection Qualifiers, Input Save-Set Qualifiers, Output File Qualifiers, and Output Save-Set Qualifiers. Qualifiers within each section appear in alphabetical order.

The Examples Section shows examples of some common BACKUP operations.

Associated Documents

The *Guide to VAX/VMS Software Installation* provides instructions for backup procedures that are employed during system installation.

The *Guide to VAX/VMS Disk and Magnetic Tape Operations* provides instructions for performing various tasks with private files and volumes; this guide includes backup examples for all levels of user.

The *VAX/VMS System Manager's Reference Manual* provides task-oriented instructions that pertain to the maintenance of public files and volumes; this guide contains backup tasks that are frequently performed by system managers, including steps for bootstrapping and running standalone BACKUP.

The *Guide to VAX/VMS System Security* describes the various security features available through the VAX/VMS operating system; you should refer to this guide for more information on data protection.

The *VAX/VMS Volume Shadowing Manual* describes how to use BACKUP on volumes mounted using the volume shadowing option.

Conventions Used in This Document

Convention	Meaning
CTRL/x	The phrase CTRL/x indicates that you must press the key labeled CTRL while you simultaneously press another key, for example, CTRL/C, CTRL/Y, CTRL/O.
$ SHOW TIME 05-JUN-1985 11:55:22	Command examples show all output lines or prompting characters that the system prints or displays in black letters. All user-entered commands are shown in red letters.
$ TYPE MYFILE.DAT . . .	Vertical series of periods, or ellipsis, mean either that not all the data that the system would display in response to the particular command is shown or that not all the data a user would enter is shown.
file-spec, . . .	Horizontal ellipsis indicates that additional parameters, values, or information can be entered.
[logical-name]	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks apostrophes	The term quotation marks is used to refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.

BACKUP

The Backup Utility provides a means of protection against file or volume corruption by creating functionally equivalent backup copies.

BACKUP is intended for use primarily by system managers and operators to protect public media; however, private users can use BACKUP to make personal backup copies and to transport files between VAX/VMS systems.

Standalone BACKUP uses a subset of Backup Utility commands and is designed for use without the support of the VAX/VMS operating system.[1]

FORMAT

BACKUP *input-specifier output-specifier* [1]

Command Qualifiers	Defaults
/BRIEF[1]	*/BRIEF*
/BUFFER_COUNT=n[1]	*=3*
/COMPARE[1]	*None.*
/DELETE	*None.*
/FAST	*None.*
/FULL[1]	*/BRIEF*
/IGNORE=option	*See text.*
/IMAGE[1]	*None.*
/INCREMENTAL	*/OWNER_UIC=ORIGINAL*
/[NO]INITIALIZE[1]	*See text.*
/INTERCHANGE[1]	*None.*
/JOURNAL[=file-spec]	*None.*
/LIST[=file-spec][1]	*See text.*
/[NO]LOG[1]	*/NOLOG*
/PHYSICAL[1]	*None.*
/RECORD[1]	*None.*
/[NO]TRUNCATE[1]	*/NOTRUNCATE*
/VERIFY[1]	*None.*
/VOLUME=n[1]	*None.*

Input File-Selection Qualifiers	Defaults
/BACKUP	*None.*
/BEFORE=time	*None.*
/CONFIRM	*None.*
/CREATED	*None.*
/EXCLUDE=(file-spec[,...])	*None.*
/EXPIRED	*None.*
/MODIFIED	*None.*
/OWNER_UIC[=[uic]]	*See text.*
/SINCE=time	*None.*

[1] Can be used with standalone BACKUP.

Input Save-Set Qualifiers	Defaults
/[NO]CRC[1]	*/CRC*
/[NO]REWIND[1]	*/NOREWIND*
/SAVE_SET[1]	*None.*
/SELECT=(file-spec[,...])	*None.*

Output File Qualifiers	Defaults
/NEW_VERSION	*None.*
/OVERLAY	*See text.*
/OWNER_UIC[=option]	*/OWNER_UIC=DEFAULT*
/REPLACE	*None.*

Output Save-Set Qualifiers	Defaults
/BLOCK_SIZE=n[1]	*See text.*
/COMMENT=string[1]	*None.*
/[NO]CRC[1]	*/CRC*
/DENSITY=n[1]	*See text.*
/GROUP_SIZE=n[1]	*/GROUP_SIZE=10*
/LABEL=(string[,...])[1]	*None.*
/OWNER_UIC=[uic][1]	*See text.*
/PROTECTION[=(code)][1]	*See text.*
/[NO]REWIND[1]	*/NOREWIND*
/SAVE_SET[1]	*None.*

Command Parameters

input specifier

Specifies the input for the backup operation. The input specifier is a standard VAX/VMS file specification (including save-set specifications), although a device name alone is valid in many BACKUP operations. If the file specification is a save set on disk, it must include the /SAVE_SET qualifier.

DECnet–VAX node names are not allowed in a Files–11 specification, but they are allowed in a save-set specification.

Wildcards are permitted for Files–11 specifications and for save-set specifications on magnetic tape.

output specifier

Specifies the output for the backup operation. The output specifier, like the input specifier, can be either a VAX/VMS file specification, a save-set specification, or a device name. A save set on disk must be specified with the /SAVE_SET qualifier. DECnet–VAX node names are allowed only in a save-set specification.

Wildcard characters are allowed when the output specifier is a Files–11 volume, but are not allowed when the output specifier is a BACKUP save set or a volume created by a BACKUP/PHYSICAL or BACKUP/IMAGE operation. BACKUP restricts output wildcard character usage; refer to Section 2.1.2 for details.

[1] Can be used with standalone BACKUP.

usage summary

Invoking

To invoke the Backup Utility, enter the BACKUP command at the DCL prompt.

BACKUP evaluates the input and output specifier to determine whether it is to perform a copy, save, or restore operation. With the exception of list operations, BACKUP operations are mutually exclusive; that is, a single BACKUP command can perform only a copy, save, restore or compare operation. However, each of the other BACKUP operations can be combined with a list operation by using the /LIST command qualifier in the BACKUP command line.

Table BACKUP-1 lists BACKUP command formats and the type of input and output specifiers for each type of command. Note that the /IMAGE qualifier causes BACKUP to perform an image operation. In an image operation, BACKUP saves, copies, or restores an entire volume or volume set.

Table BACKUP–1 BACKUP Command Formats by Operation Type

Operation	Format
Save	BACKUP file-spec save-set-spec
Save (image)	BACKUP/IMAGE device-spec save-set-spec
Restore	BACKUP save-set-spec file-spec
Restore (image)	BACKUP/IMAGE save-set-spec device-spec
Copy	BACKUP file-spec file-spec
Copy (image)	BACKUP/IMAGE device-spec device-spec
Compare	BACKUP/COMPARE file-spec file-spec
	BACKUP/COMPARE save-set-spec file-spec
Compare (image)	BACKUP/COMPARE/IMAGE save-set-spec device-spec
	BACKUP/COMPARE/IMAGE device-spec device-spec
List[1]	BACKUP/LIST save-set-spec or device-spec

[1]Can also be used in conjunction with any other operation listed here.

See Section 2.1 of the Description Section for a complete description of the input and output specifiers.

Note that you cannot invoke standalone BACKUP simply by entering a command as shown above. The Description Section of this manual includes a section on standalone BACKUP; however, you should refer to the *VAX/VMS System Manager's Reference Manual* for detailed instructions on preparing and running standalone BACKUP.

Exiting

BACKUP returns to the DCL prompt after completing its task. If you press CTRL/Y during execution of a backup operation, processing is halted. If the process is creating a file when you press CTRL/Y, the file is closed immediately and thus only partially created.

Directing Output

The output specifier directs the output to either a file or save set on disk or magnetic tape (see Command Parameters for a description of the output specifier).

Privileges/Restrictions

You need the user privilege TMPMBX to interact with the operator from batch modes.

If you are performing a save operation to sequential disk, you need the user privilege PHY_IO or LOG_IO to write to the continuation volume.

Following is a list of BACKUP qualifiers that require special privileges:

/FAST	Requires write access to INDEXF.SYS and BITMAP.SYS files, in order to interlock with file system caches. (It is permissible, however, to have the volume mounted write-locked.)
/IGNORE=option	Use of the INTERLOCK option requires the user privilege SYSPRV, a system UIC, or ownership of the volume.
/IMAGE	Requires read access to all files on the input disk. Requires write access to the INDEXF.SYS and BITMAP.SYS files, in order to interlock with file system caches. (It is permissible, however, to write-lock the input volume.) The output volume must be mounted /FOREIGN.
/PHYSICAL	Input and output disk must have been mounted /FOREIGN, or the user must have the user privilege LOG_IO.
/RECORD	The user privilege SYSPRV (or the equivalent) is required to use the /RECORD qualifier on files with a UIC other than yours.
/OWNER_UIC=option	As an output file qualifier, /OWNER_UIC=option requires that you have the user privilege SYSPRV, or that you be the owner of the output volume in order to use the options ORIGINAL, PARENT, or UIC. As an output save-set qualifier applied to Files–11 disk save sets, /OWNER_UIC=option requires that you have the user privilege SYSPRV or that you be the owner of the output volume for any option.

DESCRIPTION

The Backup Utility allows you to create and restore backup copies of files and directories from Files–11 Structure Level 1 and 2 volumes. You can use BACKUP to back up an entire volume set in a single operation, or to back up selected groups of files from a volume or volume set. Wildcards are permitted in some BACKUP operations.

BACKUP supports three types of qualifiers:

- Command qualifiers
- Input-specifier qualifiers
- Output-specifier qualifiers

Command qualifiers can be placed anywhere in the command line, but input- and output-specifier qualifiers are position dependent. Several BACKUP qualifiers can be used in more than one way, so their result depends upon their position in the command line. Detailed descriptions of all BACKUP qualifiers follow this section.

The Backup Utility can perform the following operations:

- Copy disk files
- Save disk files to a BACKUP save set
- Restore files to disk from a BACKUP save set
- Compare disk files or files in a BACKUP save set with other disk files
- List information about files in a BACKUP save set to an output device or file

BACKUP saves disk files on disk or magnetic tape. Files created by the Backup Utility are called save sets and are written in BACKUP format; only the Backup Utility can interpret the data in a save set. A save-set specification is a file specification that identifies a file containing data in BACKUP format. There is no default file type for save-set specifications.

Standalone BACKUP uses a subset of the BACKUP qualifiers and can be bootstrapped from a console block storage device or from a Files–11 disk. You can use standalone BACKUP to back up your system disk or to save, copy, or restore entire disk volumes while VAX/VMS is not running. Section 4 discusses standalone BACKUP and provides a list of the qualifiers it accepts; for instructions on bootstrapping standalone BACKUP and using it to perform specific operations, refer to the *VAX/VMS System Manager's Reference Manual.*

Any user of BACKUP or standalone BACKUP should be familiar with the *VAX/VMS DCL Concepts Manual.*

1 Using BACKUP: A Guide for New Users

This section is a guide for new or periodic users of BACKUP. Its purpose is to introduce BACKUP and to illustrate some common BACKUP operations.

If you are an inexperienced user of BACKUP, read this guide carefully, and then read the rest of the Description Section. Many of the explanations in this guide are elaborated upon in the remainder of the Description Section. If you spend a little time preparing yourself to use BACKUP, you will be better equipped to take advantage of its features.

If you are already familiar with BACKUP and you understand its purpose and function, you may wish to scan this section as a review.

This section includes:

- A summary of the BACKUP function
- A list of BACKUP operation types and modes
- An explanation of the difference between online BACKUP and standalone BACKUP
- Overviews of BACKUP input and output specifiers, and BACKUP qualifiers
- Details on specifying files, save sets, and devices in BACKUP commands
- Instructions on preparing storage media for use with BACKUP
- Directions to further information on BACKUP and its applications

BACKUP
Description

1.1 BACKUP Function

The primary function of the Backup Utility is to safeguard against the loss or corruption of data. BACKUP accomplishes this function by duplicating files or volumes of files. Thus, if an original file or volume is lost, deleted, or corrupted, a "backup" copy containing the original data will be available to replace it. Additionally, BACKUP helps to provide a more flexible file storage system. For example, backup copies of files can be stored off line on magnetic tapes to free space on volumes such as the system disk. Also, archives of backup copies can be maintained, so that as original files are modified, backup copies will preserve the earlier versions of the files.

BACKUP duplicates data by copying or saving files.

When BACKUP copies files, the results are different from those of the DCL command COPY. Copies created by the COPY command are essentially new files because their file headers are modified to update fields such as creation date, revision date, and protection code. However, BACKUP duplicates the file-specific fields in the file headers (although in some BACKUP operations the default owner of BACKUP files is the owner of the current process, not the owner of the original file). Finally, unlike the COPY command, BACKUP can verify the success of data transfer by checking the validity of output files. For these reasons, copying files with BACKUP produces functionally equivalent copies.

When BACKUP saves files, it creates a special file in BACKUP format on the specified output volume. This special BACKUP file is called a *save set*. Only BACKUP can interpret save sets, because they are written in a unique BACKUP format that improves the efficiency of file transfer and storage. After creating the save set, BACKUP duplicates, or saves, the specified files into the save set. Saving files with BACKUP can provide a convenient method of managing disk space. For example, when you save an entire volume into a BACKUP save set (which is called an image save) and then restore the files in the volume, BACKUP stores the files contiguously, thereby compressing the allocated blocks. Furthermore, BACKUP maintains an internal check against media deterioration by writing redundant data that allows it to reconstruct files that may be corrupted.

1.2 BACKUP Operation Types and Modes

BACKUP is a versatile utility; it can perform several operations, in several different ways, or modes. This section briefly describes the types of BACKUP operations and the modes in which these operations may be performed.

1.2.1 BACKUP Operation Types

As previously stated, two BACKUP operations are *copy* operations and *save* operations. Of course, since BACKUP saves files to save sets written in BACKUP format, it must also furnish a way to *restore* files from the save sets to their original state. Thus, restoring data is another BACKUP operation. In addition, BACKUP can *compare* two files or volumes to determine any differences between them. Finally, BACKUP can *list* data about the files contained in a save set. To summarize, the BACKUP operations are

- Copy
- Save
- Restore

- Compare
- List

With the exception of list operations, the BACKUP operation types are mutually exclusive; that is, a single BACKUP command can perform only a copy, save, restore or compare operation. However, each of these BACKUP operations can be combined with a list operation. Additionally, save and list operations can be combined with the /JOURNAL command qualifier to create and list journal files of BACKUP save sets.

1.2.2 BACKUP Operation Modes

There are several modes, or ways, in which BACKUP operations can be performed. In Files–11 mode, BACKUP can copy, save, or restore individual files or directories. Or BACKUP can duplicate or restore an entire volume or volume set in a single operation, which is called an *image* operation. It can also save, copy, restore, or compare volumes by logical blocks instead of by file structure; this is called *physical* mode. Alternatively, BACKUP can process files or volumes in *selective* mode, which allows you to choose the files that you wish to include or exclude in a copy, save, or restore operation. Finally, in *incremental* mode, only those files that have been created or modified since the last backup are processed. To summarize, the BACKUP operation modes are

- File by file
- Image
- Physical
- Incremental
- Selective

The operation modes are mutually exclusive because each mode is designed to accomplish a specific purpose. You use command qualifiers to perform image and physical backups (/IMAGE and /PHYSICAL, respectively). You use input file-selection qualifiers to perform incremental and selective backups. BACKUP qualifiers and their functions are described in Section 1.5.

1.3 BACKUP Versions: Online and Standalone

BACKUP can be used during normal system operation or when the system is offline. Accordingly, there are two versions of the Backup Utility:

- *Online* BACKUP, which runs under the control of the VAX/VMS operating system
- *Standalone* BACKUP, which is bootstrapped into main memory in place of the operating system

Online BACKUP is intended for processing user disks. Some examples of online BACKUP usage are backing up a public disk, copying a directory tree across volumes, or duplicating the files in your directory. Standalone BACKUP is primarily intended for backing up the system disk. You can use online BACKUP to back up the system disk, but it is not recommended that you do so, because data can be lost from files that are open for system write access while the backup is being done.

This introduction discusses online BACKUP; standalone BACKUP is described in Section 4.

1.4 BACKUP Input and Output Specifiers

Take a look at the BACKUP command format on page BACKUP-1. Notice that *input-specifier* and *output-specifier* are the names given to the parameters in the BACKUP command line. You provide an input specifier and an output specifier for each BACKUP command, with the exception of list or compare operations, to which you provide input specifiers only. The input specifier indicates the location of the input and tells the BACKUP command how the input is to be treated. The output specifier indicates where BACKUP is to direct output and the mode of operation it is to perform.

The input and output specifiers indicate which BACKUP operation is to be performed, so it is essential that you understand how to use them correctly. Also, BACKUP operations can be modified by the use of optional input and output qualifiers. In many cases, the action directed by these qualifiers depends upon the type of input or output specifier. Therefore, you need to be familiar with the different kinds of specifiers. An input or output specifier may be

- A file specification
- A save-set specification
- A device specification

Table BACKUP-1, located in the usage summary preceding this description, summarizes the input and output specifiers for BACKUP operations. In addition, the following sections further explain each type of specifier.

1.4.1 File Specifications

File specifications used as BACKUP input or output specifiers can be any valid VAX/VMS file specification as described in the *VAX/VMS DCL Concepts Manual*, except that node names are not allowed in BACKUP file specifications. You can use wildcard characters in BACKUP file specifications. You can also list multiple file specifications as input to a single save operation. For example, the following command saves all types and versions of the files SALES and EXPENSES to a save set on disk:

```
$ BACKUP [MY_DIR]SALES.*;*,EXPENSES.*;* DBA0:INCOME.BCK/SAVE_SET
```

You use file specifications in the following types of BACKUP operations:

To copy files to files
To save files to a save set
To restore files from a save set to a file or files
To compare two sets of files
To list or log files
To create and list journal files

1.4.2 Save-Set Specifications

A save-set specification is a label for a BACKUP save set. When you direct BACKUP to save files or volumes, it creates and labels a save set and then writes your files to the save set. Thereafter, you can specify the save set as input to other BACKUP operations. Save-set specifications are subject to the conventions for specifying files as outlined in the *VAX/VMS DCL Concepts Manual*. Therefore, a save-set specification can include

- A node name
- A device specification
- A directory
- A save-set name
- A period (the mandatory delimiter after the save-set name)
- A save-set type

A save-set specification can include a node name because you can create or access save sets on remote nodes (a remote node is a system that your system can access across a network). To do so, specify the node name (followed by two colons) immediately before the save-set specification, and use the /SAVE_SET qualifier with the BACKUP command. For example:

```
$ BACKUP [MYDIR] DOUBLE::DBA0:SAVEIT.BCK/SAVE_SET
```

The command above saves all of the files in [MYDIR] to a save set named SAVEIT.BCK on disk drive DBA0 located on DOUBLE (the name of the remote node). In some cases, you may have to include an access control string with the node name. Refer to Section 3.3 for an example of an access control string.

Note that if the save set is stored on a Files–11 structured disk, the save-set specification may include a directory between the device name and the save-set name. If the device name or directory is not included in a save-set specification, BACKUP assumes the current default device or directory specification.

When you name a save set on disk, the save-set name may be as many as 39 characters, and the save-set type may be as many as 39 characters. However, when you name a save set on magnetic tape, the entire save-set specification cannot exceed 17 characters. Wildcard characters are allowed in a save-set specification only if the save set is being used as an input specifier and is stored on magnetic tape.

It is customary to use .BCK or .SAV as the BACKUP save-set type, but it is not necessary to include a type in the save-set specification. There is no default save-set type. However, if you specify a save-set name without a period or type, BACKUP will append a period to the name. You must then include the period with the save-set name in subsequent operations, as the following example illustrates:

```
$ BACKUP [MYDIR] MTA0:SAVEIT
$ BACKUP/LIST SAVEIT.
```

The first command in the example above saves all of the files in the directory named [MYDIR] to a save set named SAVEIT. on the magnetic tape mounted on drive MTA0 (the colon separates the device name from the save-set specification). The second command lists the files that were written into the SAVEIT. save set.

You use save-set specifications in the following types of BACKUP operations:

To save files to a save set
To restore save sets to a file or device
To compare a save set copy of a file with a file on disk
To list data about a save set

Note: You cannot use save-set specifications as both the input and output specifiers in a BACKUP command line. Therefore, because BACKUP treats all magnetic tapes as save-set specifications, you cannot specify a magnetic tape as both the input and output specifier. In other words, BACKUP does not perform operations from a magnetic tape to another magnetic tape.

1.4.3 Device Specifications

Device specifications used as BACKUP input or output specifiers follow the conventions for specifying devices as outlined in the *VAX/VMS DCL Concepts Manual*. Valid physical device specifications consist of a two-letter device code, a single-letter controller designation, and a unit number.

You use device specifications in the following types of BACKUP operations:

To copy a disk volume to another disk volume
To save a volume or volume set to a physical or image save set
To restore a physical or image save set to a volume
To list data about a save set stored on the specified device

1.5 BACKUP Qualifiers

In the Format Section, beginning on page BACKUP-1, you will find a list of BACKUP qualifiers. There are five types of qualifiers that modify the default behavior of BACKUP commands:

1. Command qualifiers
2. Input qualifiers
   a. Input file-selection qualifiers
   b. Input save-set qualifiers
3. Output qualifiers
   a. Output file qualifiers
   b. Output save-set qualifiers

Most BACKUP qualifiers have a single function, that is, they fall into one of the qualifier categories shown above. However, four qualifiers can be used in more than one way. Because this can be confusing, the following list shows which qualifiers have multiple uses, and includes the different ways in which they can be used.

Qualifier	Functions		
/OWNER_UIC	Input file selection	Output file	Output save set
/[NO]CRC	Input save set	Output save set	
/[NO]REWIND	Input save set	Output save set	
/SAVE_SET	Input save set	Output save set	

Descriptions of each BACKUP qualifier follow this Description Section. When you read the description of a qualifier with multiple uses, be sure you are reading the description for the correct qualifier type. Obviously, if you use a qualifier incorrectly, your command will not produce the expected results.

The next three subsections explain the BACKUP qualifier functions.

1.5.1 Command Qualifiers

A command qualifier changes the action that a BACKUP command takes if the qualifier is not used. Command qualifiers act upon the operation mode, the input specifier, the output specifier, or both. They can be placed anywhere in the command line. As previously stated, the /IMAGE, /PHYSICAL, and /INCREMENTAL command qualifiers direct BACKUP to perform image, physical, and incremental restore operations, respectively. The /LIST and /COMPARE qualifiers, which list and compare operations, are other examples of command qualifiers.

Each BACKUP operation uses a subset of the complete set of BACKUP command qualifiers. Section 2.3, which provides detailed descriptions of BACKUP operations, includes lists of the command qualifiers that can be used with each BACKUP operation.

1.5.2 Input Qualifiers

An input qualifier changes the way that BACKUP handles the input specifier. Input qualifiers must be placed immediately after the input specifier. There are two kinds of BACKUP input qualifiers:

- Input file-selection qualifiers
- Input save-set qualifiers

1.5.2.1 Input file-selection qualifiers

Input file-selection qualifiers select specific files from the input specifier in a copy, save, or list operation. Only the selected types of files will be copied, saved, or listed. For example, the following command saves all of the files in the default directory that were created before January 1, 1986:

```
$ BACKUP *.*;*/CREATED/BEFORE=01-JAN-1986 MTB1:1985.BCK/LIST
```

Because the /LIST command qualifier is included in the above example, BACKUP lists the selected files as they are saved. In this way, you can verify that the correct files have been selected. If you specify a file with the /LIST qualifier, BACKUP will write the list of files to the specified file.

Input file-selection qualifiers are valid if the input specifier is a Files–11 disk volume or a save set. You cannot use input file-selection qualifiers in image operations. When input file-selection qualifiers are not used, the default action of the BACKUP command is to process all of the files from the input specifier.

1.5.2.2 Input save-set qualifiers

Input save-set qualifiers change the way BACKUP handles an input save set. If the input save set is stored on disk, the /SAVE_SET qualifier is necessary to identify the input specifier as a save set. For example, the following command selects all types and versions of EXPENSES stored in the save set named INCOME.BCK on device DBA0 and restores them to the current default directory:

```
$ BACKUP DBA0:INCOME.BCK/SAVE_SET/SELECT=EXPENSES.*.* []
```

Input save-set qualifiers are valid if the input specifier is a save set. Note that if you do not use the /REWIND qualifier with an input save set stored on magnetic tape, BACKUP will not rewind the tape before it attempts to locate the save set. Instead, processing will begin at the physical point at which the tape is positioned.

1.5.3 Output Qualifiers

An output qualifier changes the way that BACKUP handles the output specifier. Output qualifiers must be placed immediately after the output specifier. There are two kinds of BACKUP output qualifiers:

- Output file qualifiers
- Output save-set qualifiers

1.5.3.1 Output file qualifiers

Output file qualifiers affect the way that BACKUP copies or restores files to a Files–11 structured disk volume. For example, the following command restores all types and versions of the file SALES from the INCOME.BCK save set to the directory named [MY_DIR]:

```
$ BACKUP DBA0:INCOME.BACK/SAVE_SET/SELECT=SALES.*;* [MY_DIR]/NEW_VERSION
```

The command above has the following result: if a file currently in [MY_DIR] has the same directory, file name, and file type; and an equal or higher version number than a file that is being restored, BACKUP increments the version number of the file being restored, thereby creating a new version of the file.

If an output file qualifier is not used, by default BACKUP does not restore a file if the output directory already contains a file with the same specification. There are also output file qualifiers that allow you to replace or overlay files in the output directory; use these qualifiers carefully, because they may delete or overwrite files currently in the output directory.

Output file qualifiers are only valid if the output specifier is stored on a Files–11 disk volume. You cannot use output file qualifiers in image operations.

1.5.3.2 Output save-set qualifiers

Output save-set qualifiers affect the way BACKUP handles an output save set during a save operation. For instance, you can direct BACKUP to write a comment into a save set, or you can change the way in which the files in the save set are protected. For example:

```
$ BACKUP [MY_DIR.PERSONAL] MTA0:PERSONAL.BCK/PROTECTION=(S,O:RWED,G,W) -
_$ /COMMENT="By default, save sets written to magnetic tape are not protected"
```

The command above creates a save set named PERSONAL.BCK on MTA0 and assigns the specified protection code to the save set. The specified comment is written into the save set. Note that you have to assign protection to protect a save set stored on magnetic tape.

Output save-set qualifiers are valid if the output specifier is a save set.

1.6 BACKUP and Storage Media

You can use BACKUP to perform simple operations on public volumes, for example, to copy a file on your system disk. However, to use the full range of BACKUP capabilities, you should have a basic familiarity with storage media. You need this familiarity because BACKUP can be used in many different ways, depending on the media at your disposal. The following list provides basic definitions of some storage media terms as they are used in this manual.

Medium	A physical surface on which data is recorded, such as a magnetic tape or disk
Device	Peripheral hardware, such as a terminal, printer, or tape or disk drive, that is connected to a CPU
Volume	A logical unit of data that is stored on a single medium; commonly used to refer to a single magnetic tape or disk
Public volume	A volume that is accessible to the general community of system users
Private volume	A volume that is accessible only to a single user or subgroup of users
Magnetic tape volume	A volume that is stored on magnetic tape
Files–11 disk volume	A volume that is stored on a disk using the Files–11 disk file structure
Sequential disk volume	A disk volume with a format that allows BACKUP to continue save sets across multiple volumes
Multivolume set	A single logical unit of data that is stored on more than one physical volume; that is, on multiple tapes or disks

When you use online BACKUP with online public volumes such as your system disk, you do not have to prepare the system to access the volume. This is taken care of for you, usually by your system manager. In such cases, you can concentrate on selecting the correct BACKUP command and qualifiers for the operation you want to perform. However, when you want to use BACKUP with your own volumes, you must prepare the operating system to recognize them. For example, suppose you want to back up some files from your directory on the system disk to a magnetic tape that you can keep for your exclusive use. You have a blank tape; now what do you do? The remainder of this section shows you how to prepare the system to access volumes by using the DCL commands ALLOCATE, INITIALIZE, and MOUNT.

1.6.1 Allocating a Device

The DCL command ALLOCATE reserves a device, such as a tape drive or disk drive, for your exclusive use. Other users cannot access a device that you have allocated until you deallocate it. When you finish using a device and no longer need to have it allocated, use the DCL command DEALLOCATE. If you do not deallocate the device yourself, the system will deallocate it when you log out.

1.6.2 Initializing a Volume

The DCL command INITIALIZE formats and labels a volume. When you issue the INITIALIZE command, you specify a volume label (a name for the volume). The label can be as many as 12 alphanumeric characters for a disk volume, or up to 6 alphanumeric characters for a magnetic tape volume.

In general, you only have to initialize a disk volume when it is being used for the first time. If you are the volume owner, you can reinitialize the disk or use the DCL command SET VOLUME any time you want to change volume characteristics such as volume label or file protection. You cannot initialize a volume that has already been initialized if you are not the volume owner, unless you have VOLPRO (volume protection) privilege.

Be careful when you use the INITIALIZE command, because it removes the links to any files that are already stored on the volume being initialized. For some BACKUP operations, the /INITIALIZE command qualifier furnishes an alternative method of initializing an output disk volume.

Note: You usually do not have to initialize magnetic tape volumes for BACKUP operations. However, exceptional cases occur if you want to write an output save set on a magnetic tape that has a non-ANSI label, or on a blank tape that has never been initialized. In such cases, either initialize the tape before issuing the BACKUP command, or include the /REWIND qualifier in the BACKUP command that creates the output save set (place the qualifier after the output specifier).

1.6.3 Mounting a Volume

The DCL command MOUNT invokes the MOUNT Utility, which readies a volume for processing. Note that the MOUNT command does not physically mount a volume on a device; it merely enables the system software to recognize the volume. If you do not know how to physically mount a volume on a device, ask a system operator to mount it for you, or to show you how to mount it. If you try to mount the volume yourself and fail, by default a message will be sent to the operator requesting assistance.

When you mount a Files–11 disk volume, you include in the command line the volume label that was specified when the volume was initialized. However, when you mount a volume stored on magnetic tape or sequential disk for a BACKUP operation, you use the /FOREIGN qualifier with the MOUNT command. You do not specify a volume label with the /FOREIGN qualifier. Unless you are the volume owner or the volume is new, VOLPRO privilege is required to use the /FOREIGN qualifier.

After your BACKUP operation is complete and before you physically remove your volume from the disk or tape drive, dismount the volume by using the DCL command DISMOUNT. The DISMOUNT command releases a volume mounted by the Mount Utility.

The next section includes examples of how to mount media for BACKUP operations.

1.7 BACKUP Save Sets and Output Volumes

You can create BACKUP save sets on a variety of output volumes, depending on the media at your disposal and the size of the save sets. The possible types of save sets are:

- Magnetic tape save sets
- Files–11 disk save sets, also called save-set files
- Sequential disk save sets
- Remote node save sets, also called network save sets
- Multiple volume save sets, called multivolume save sets

Section 3.3 describes multivolume save sets, and Section 3.5 describes network save sets. This section provides examples of how to create save sets on magnetic tapes, Files–11 disks, and sequential disks.

1.7.1 Creating Save Sets on a Magnetic Tape Volume

Routine backups at your installation are probably done to magnetic tape volumes. In general, magnetic tape storage is less expensive than disk storage, and tapes are easier to store. However, a disadvantage of tape storage is that files stored on tape must be accessed sequentially.

The following command sequence creates a save set on a magnetic tape volume. The example assumes that your input medium is a public volume that is already mounted (such as your system disk).

```
$ SET DEFAULT [MY_DIR.PERSONAL]
$ ALLOCATE MTA0:
$ MOUNT/FOREIGN MTA0:
$ BACKUP/LIST=BACK.LOG [...] MTA0:MY_OWN_BACKUP.BCK/REWIND
$ DISMOUNT MTA0:
$ DEALLOCATE MTA0:
```

The first command sets the default directory to the directory from which the files will be backed up. Although it is not necessary to do this, it makes the BACKUP command shorter. The second command allocates tape drive MTA0 for your exclusive use. Then the MOUNT command logically mounts the tape on the drive. If you have not already physically mounted the tape on the drive, the MOUNT command will prompt the system operator to do so. When you mount a tape yourself, remember to place the drive on line after the tape is loaded. The /FOREIGN qualifier indicates that the volume being mounted is not a file-structured volume. Accordingly, you do not have to specify a label with the MOUNT command. Whenever you use magnetic tapes in BACKUP operations, mount them with the /FOREIGN qualifier. Now that the output volume has been mounted, the system is prepared for the BACKUP command.

The /LIST command qualifier directs BACKUP to list the saved files. BACKUP writes the list to the file specified by the /LIST qualifier, which in this case is BACK.LOG. The [. . .] form of the directory specification indicates that all of the files in the default directory, and any subdirectories, are to be saved. Note that the save-set name and type cannot exceed 17 characters on a magnetic tape. Finally, the /REWIND qualifier directs BACKUP to rewind the tape to the beginning-of-tape marker before it initializes the tape and writes the save set. When the /REWIND qualifier is not used, by default BACKUP writes the save set starting at the current end of data. You should also use the /REWIND qualifier if a tape has a non-ANSI label, or if a tape is blank and has never been initialized.

When the BACKUP operation has finished and the system prompt returns, dismount the tape and deallocate the tape drive.

1.7.2 Creating Save Sets on a Files–11 Disk Volume

The files on a Files–11 disk volume are stored according to the Files–11 file structure. An advantage to creating save sets on a Files–11 disk is that a directory structure can be maintained on the backup volume, as the following example illustrates. The example assumes that your input medium is a public volume (such as your system disk) that is already mounted and the output volume is being used for the first time. Therefore, the output volume needs to be initialized.

```
$ SET DEFAULT SYS$DISK:[MY_DIR.PERSONAL]
$ ALLOCATE DBA0:
$ INITIALIZE DBA0: BACKUPS
$ MOUNT DBA0: BACKUPS
$ CREATE/DIR DBA0:[PERSONAL]
$ BACKUP [PERSONAL...] DBA0:[PERSONAL]BACKUP_COPIES.BCK/SAVE_SET
$ DISMOUNT DBA0:
$ DEALLOCATE DBA0:
```

The first command sets the default directory on the system disk to the subdirectory [MY_DIR.PERSONAL]. The second command allocates disk drive DBA0 for your exclusive use. Then the disk in drive DBA0 is initialized and mounted with the label BACKUPS. Next, a directory named [PERSONAL] is created on the output volume. Finally, all of the files in the [PERSONAL] subdirectory (and its subdirectories, if any) are saved to the [PERSONAL] directory in a save set named BACKUP_COPIES.BCK. The /SAVE_SET qualifier is necessary to identify a save set on disk. Finally, when the BACKUP operation is complete, the volume can be dismounted and the disk drive deallocated.

1.7.3 Creating Save Sets on a Sequential Disk Volume

A BACKUP sequential disk volume allows sequential access to files stored on disk. Sequential disk volumes are managed directly by BACKUP instead of by the VAX/VMS Files–11 file system. The file formats used by BACKUP and the file system are compatible, so the same disk may be used as a Files–11 disk and as a sequential disk. The primary advantage to using sequential disk volumes in BACKUP operations is that you can mount save sets stored on multiple volumes (multivolume save sets), one volume at a time. The following example shows you how to create a save set on a sequential disk volume. The example assumes that your input medium is a public volume (such as your system disk) that is already mounted and the output volume is being used for the first time. Therefore, the output volume needs to be initialized.

```
$ SET DEFAULT SYS$DISK:[MY_DIR.PERSONAL]
$ ALLOCATE DBA0:
$ INITIALIZE DBA0: BACKUPS
$ MOUNT/FOREIGN DBA0:
$ BACKUP [PERSONAL...] DBA0:BACKUP_COPIES.BCK/SAVE_SET
$ DISMOUNT DBA0:
$ DEALLOCATE DBA0:
```

The first command sets the default directory on the system disk to the subdirectory [MY_DIR.PERSONAL]. The second command allocates disk drive DBA0 for your exclusive use. Then the disk in drive DBA0 is initialized and mounted with the /FOREIGN qualifier (as you would mount a magnetic tape). Next, all of the files in the [PERSONAL] subdirectory (and its subdirectories, if any) are saved to a save set named BACKUP_COPIES.BCK. The /SAVE_SET qualifier is necessary to identify a save set on disk, regardless of whether the disk is sequential or Files–11. Finally, when

the BACKUP operation is complete, the volume can be dismounted and the disk drive deallocated.

1.8 Where to Look for Further Instructions

This section has introduced the Backup Utility. At this point, reading or rereading the other sections of this manual will improve your understanding of how to use BACKUP. For instructions on using BACKUP to copy, save, restore, compare, or list files, refer to Section 2.3. To learn about BACKUP journal files, see the /JOURNAL qualifier description. For further information about output volumes, refer to Section 3. For instructions on using BACKUP qualifiers, refer to the description of each particular qualifier. For more advanced examples of BACKUP usage, refer to the examples following the qualifier descriptions.

For further instructions on handling devices and volumes, refer to the *Guide to VAX/VMS Disk and Magnetic Tape Operations*. For detailed descriptions of the DCL commands ALLOCATE and INITIALIZE, see the *VAX/VMS DCL Dictionary*. The DCL command MOUNT is described in the *VAX/VMS Mount Utility Reference Manual*.

To learn how to use BACKUP for system management functions such as backing up a system disk, installing a system upgrade, or backing up public volumes, refer to the *VAX/VMS System Manager's Reference Manual*.

2 BACKUP Command Syntax

For most operations, the BACKUP command requires an input specifier and an output specifier. This section describes how to use BACKUP input and output specifiers. Section 2.1 discusses the use of input and output specifiers; Section 2.1.2 discusses the use of wildcard characters; Section 2.2. explains BACKUP modes, and Section 2.3 describes the various BACKUP operations.

2.1 Input and Output Specifiers

Input and output specifiers can be either standard VAX/VMS file specifications, save-set specifications, or device specifications. However, you cannot use save sets for both the input and output in a BACKUP command. Since BACKUP treats all magnetic tape volumes as save sets, this means that you cannot use magnetic tape volumes for both input and output. In other words, BACKUP does not perform operations from one magnetic tape to another magnetic tape.

Save-set specifications can include node names; Files–11 specifications cannot.

A save set can be located on any one of the following devices:

- Magnetic tape mounted with the DCL command MOUNT/FOREIGN
- A Files–11 disk (called a save-set file)
- A Files–11 disk mounted with the DCL command MOUNT/FOREIGN (called a sequential-disk save set)
- A file on a remote VAX/VMS node (called a network save set)

Note that magnetic tapes must be mounted with the DCL command MOUNT/FOREIGN to be used in any BACKUP operation.

Normally, BACKUP assumes that an input or output specifier that refers to a Files–11 Structure disk is a file specification; the /SAVE_SET qualifier is used to specify a save set on a Files–11 volume. An input or output specifier that refers to magnetic tape is always a save set. (Section 3 describes the media on which BACKUP records its save sets.) Table BACKUP-1, which follows the Command Format Section, shows the types of input and output specifiers used in each type of BACKUP operation.

2.1.1 Element Lists

Normally, you cannot include element lists in either the input specifier or output specifier command parameters. However, the following are cases where element lists are allowed:

- When an input specifier refers to a Files–11 medium. In this case, lists can be constructed from standard VAX/VMS file specifications.
- When an input specifier or an output specifier refers to a BACKUP save set on magnetic tape or sequential disk. In this case, list elements can be constructed from device names and a save-set name. However, the save-set name must appear with the device name as the first element in the list, and must not appear in subsequent elements in the list. Thus, you can process multivolume save sets efficiently by specifying the rotational order for processing in the element list. The second (or subsequent) volume is processed while the first (or previous) volume is being changed. This rotational order continues as specified until the entire save set is processed.
- When an image operation refers to a volume set. In this case, the output specifier can be an element list. If you are running standalone BACKUP, element lists are valid for the input specifier as well as the output specifier.

2.1.2 Wildcard Characters

The Backup Utility allows a number of wildcard characters to be used as part of file specifications. (For introductory information on wildcard characters, refer to the *VAX/VMS DCL Concepts Manual*.) Directories, file names, types, and version numbers can all be represented by wildcard characters. Note that omitting the version number causes all versions to be processed. Omitted file names, types, or version numbers are assumed to be wildcard characters.

Any valid DCL wildcard character can be used with input specifiers that are Files–11 media or with the /SELECT and /EXCLUDE input qualifiers. Note, however, that the latest version (;0) and relative versions (;-n) are treated as the all-version wildcard specification (;*) with the /EXCLUDE and /SELECT qualifiers.

Wildcard characters cannot be used with save sets unless the save sets are input specifiers on tape.

Only certain types of directory wildcards are allowed for output specifiers that are Files–11 media.

- omitted
- [* . . .]
- [directory]
- [directory . . .]

If the directory is omitted, BACKUP uses the default directory [ ].

If the form [* . . .] is used, files are restored to the directory from which they were saved.

If the form [directory] is used, files are restored to the named directory.

If the form [directory . . .] is used, the wildcard characters used in the specification of the input files affect the directory to which the files are restored. If you use this form for both the input and the output specifier in a copy operation, BACKUP takes only the portion of the specification represented by the ellipsis (. . .) and places it before the ellipsis in the output specification. The result is that the directory named in the input specifier is replaced by the directory named in the output specifier. For example:

```
$ BACKUP [OSCAR...] [JOE.RAY...]
```

This command causes the directory [OSCAR] to be duplicated as a directory named [JOE.RAY] and all subdirectories (. . .) of [OSCAR] to be duplicated as subdirectories of [JOE.RAY]. Note that when you change the directory level, as is done in this example ([OSCAR] is a top-level directory, [JOE.RAY] is a second-level directory), you run the risk of losing a subdirectory. VAX/VMS directory trees can have as many as eight levels. Starting at the second level, [JOE.RAY] can have a maximum of six more subdirectories. Therefore, if [OSCAR] has a complete set of seven subdirectories, the final one cannot be duplicated.

If you use the asterisk wildcard character (*) to represent a subdirectory in a copy operation input specifier, all of the directories higher than the subdirectory represented by an asterisk in that specifier are replaced by the directory named in the output specifier. For example:

```
$ BACKUP [SAM.DAVE.*.OTIS] [JAMES...]
```

Because [SAM.DAVE] becomes a directory named [JAMES], with all subdirectories carried over accordingly, the resulting output file is [JAMES.*.OTIS].

In a restore operation, the input specifier defaults to [* . . .] if the /SELECT qualifier is not used; you should bear this in mind if you use the form [directory . . .] in the output specifier. The function of the wildcard [* . . .] is to carry over the entire directory name, from the first level on, and to place it before the ellipsis in the output specifier. Thus, if the save set in the following example contains [SAVE . . .], the restored directory will be [WORK.SAVE . . .]:

```
$ BACKUP MTAO:SAVE.BCK [WORK...]
```

Note that the result will be the same even if your output specifier has the same name as the directory in the input specifier, as in the following example:

```
$ BACKUP MTAO:SAVE.BCK [SAVE...]
```

This command restores a directory named [SAVE . . .] to a directory named [SAVE.SAVE . . .]. If you want to retain the original directory name without using the /SELECT qualifier, you must use the form [* . . .] for the output specifier:

```
$ BACKUP MTAO:SAVE.BCK [*...]
```

The asterisk wildcard (*) causes BACKUP to restore the full directory specification from the save set; in this example, the directory [SAVE . . .] in save set SAVE.BCK is restored to [SAVE . . .].

The input save-set qualifier /SELECT causes only the ellipsis portion of the selected file specification to be carried over to the directory named in the output specifier [directory . . .]. The following command restores [SAVE . . .] to [SAVE . . .]:

```
$ BACKUP MTAO:SAVE.BCK/SELECT=[SAVE...] [SAVE...]
```

As an alternative, you can use the form [* . . .] in the output qualifier to achieve the same result:

```
$ BACKUP MTAO:SAVE.BCK/SELECT=[SAVE...] [*...]
```

The following DCL command renames the directory to [WORK . . .]:

```
$ BACKUP MTAO:SAVE.BCK/SELECT=[SAVE...] [WORK...]
```

2.2 BACKUP Modes

The various BACKUP operations (copy, save, restore, list, compare) can be performed in the following modes:

- File by file

  You can back up individual files or directories. For example, this command creates a copy of a file named PHONE.LIS and places it in a directory [SAVE]:

  ```
  $ BACKUP PHONE.LIS [SAVE]PHONE.LIS
  ```

- Image (using the /IMAGE command qualifier)

  An image operation allows you to create a functionally equivalent copy of the entire volume or volume set.

  ```
  $ BACKUP/IMAGE DBA2: MTA1:13MAY.BCK
  ```

  This command creates a save set of the entire disk volume DBA2 on tape.

- Physical (using the /PHYSICAL command qualifier)

  The BACKUP/PHYSICAL operation copies, saves, restores, or compares the entire volume in terms of logical blocks, ignoring any file structure. The following command saves an unstructured disk volume:

  ```
  $ BACKUP/PHYSICAL DMAO: MTA1:OLIVIA.BCK
  ```

- Selective or incremental

  BACKUP can process files or volumes selectively, according to criteria such as version number, file type, UIC, date and time of creation, expiration date, or modification date. Specific files that otherwise meet the selection criteria can be excluded. (For more information on selective backups, see the descriptions of input specifier qualifiers such as /BACKUP, /BEFORE, /CREATED, /EXCLUDE, /EXPIRED, /MODIFIED, /OWNER_UIC, /SELECT, and /SINCE.)

  Incremental backups save only those files that were created or modified since the last backup. The /SINCE=BACKUP qualifier directs BACKUP to select only those files that have been created or modified since the last BACKUP/RECORD operation; the /RECORD qualifier directs BACKUP to record the current date in the backup date field of each file header. For example:

  ```
  $ BACKUP/RECORD  DBA1:[*...]/SINCE=BACKUP MTAO:13MAY.BCK
  ```

This command saves all files on DBA1 that have been created or modified since the last backup, and records the current time as their new backup date.

You can use the /INCREMENTAL qualifier to restore a Files–11 disk volume from a save set that was created with the /IMAGE qualifier and a series of incremental save sets. (See the descriptions of the /SINCE=BACKUP, /RECORD, /INCREMENTAL command qualifiers for more information on incremental backups.)

2.3 BACKUP Operations

This section describes the operations BACKUP performs and contains examples that illustrate typical commands used to copy, save, restore, list, and compare files. Each section lists the command qualifiers that can be used in the type of operation described.

In the examples given, assume that a tape has been mounted using the /FOREIGN qualifier, and has the logical name TAPE:.

2.3.1 Copying Files

The BACKUP copy operation creates equivalent copies of files, directories, directory structures, and disks.

The BACKUP copy operation produces results that are different from those of the DCL command COPY. The DCL command COPY makes "new copies" of files, updating the revision dates and assigning protection codes from the applicable defaults. The BACKUP copy operation, however, makes copies that are identical to the originals, including revision dates and protection codes (although, by default, the owner user identification code of the copies will be the user identification code of the owner of the current process).

For example, the following command directs BACKUP to copy the highest numbered version of file UPLIFT.PAS in the directory [LYKINS] to the directory [OWLCR] and to name the file UPLIFT.PAS;1:

```
$ BACKUP [LYKINS]UPLIFT.PAS;  [OWLCR]UPLIFT.PAS;1
```

You can use the following command qualifiers in a BACKUP copy operation:

/BRIEF[1]	/FAST	/FULL[1]
/IGNORE=option	/IMAGE[1]	/[NO]INITIALIZE[1]
/LIST[=filespec][1]	/[NO]LOG[1]	/PHYSICAL[1]
/RECORD	/[NO]TRUNCATE[1]	/VERIFY[1]
/VOLUME=n[1]		

[1]Can be used with standalone BACKUP

2.3.2 Saving Files

A BACKUP save operation places a selected disk file or directory into a save set on disk or magnetic tape. For example, you can create a save set of the current default directory as follows:

```
$ BACKUP *   TAPE:NOV12SAVE.BCK
```

All the files in the current default directory will be saved in a save set named NOV12SAVE.BCK (a reminder that the save operation was done on November 12). Note that the save-set name can be any valid VAX/VMS file name and type, with the following restrictions. When you name a save set on a disk, the save-set name may be as many as 39 characters, and the save-set type may be as many as 39 characters. However, when you name a save set on a magnetic tape, the entire save-set specification cannot exceed 17 characters. Also, BACKUP ignores version numbers on magnetic tape save sets.

To create a backup file that contains all files and subdirectories of a directory named [LYKINS], enter the following:

```
$ BACKUP [LYKINS...]*   TAPE:NOV13SAVE.BCK
```

All files in the directory [LYKINS], all subdirectories of [LYKINS], and all the files in those subdirectories will be included in the save set NOV13SAVE.BCK.

You can create a backup file of a single file as follows:

```
$ BACKUP STRATCOL1.DAT   TAPE:STRATDAT1.BCK
```

The file STRATCOL1.DAT will be saved in the save set STRATDAT1.BCK. Note that this saves all versions of the file, since the version number is omitted.

If you specify multiple devices to handle a multivolume save set, you must specify the save-set name only with the first device; separate the other devices with commas. For example:

```
$ BACKUP * MTA0:14AUG,MTA1:
```

You can use the following command qualifiers in a BACKUP save operation:

/BRIEF[1]	/DELETE	/FAST
/FULL[1]	/IGNORE=option	/IMAGE[1]
/INITIALIZE	/JOURNAL[=filespec]	/LIST[=filespec][1]
/[NO]LOG[1]	/PHYSICAL[1]	/RECORD[1]
/VERIFY	/VOLUME=n[1]	

[1]Can be used with standalone BACKUP

2.3.3 Restoring Files

The BACKUP restore operation enables you to recover the data that resides in a BACKUP save set. For example, you can restore all files in the save set to the current default directory as follows:

```
$ BACKUP TAPE:NOV12SAVE.BCK []
```

The following example restores files in subdirectories:

```
$ BACKUP TAPE:NOV12SAVE.BCK [LYKINS...]
```

To restore a specific file from a save set, you can use the /SELECT qualifier. In the following example, the file STRAT1.DAT in the directory [LYKINS.GLENDO] has been accidentally deleted. The user has previously saved the file in the save set NOV2SAVE.BCK.

```
$ MOUNT/FOREIGN MTA0:
%MOUNT-I-MOUNTED, NOV25A mounted on _MTA0:
$ BACKUP
_From: MTA0:NOV2SAVE.BCK/SELECT=[LYKINS.GLENDO]STRAT1.DAT;5
_To:   STRAT1.DAT;5
$ DIRECTORY STRAT1.DAT
Directory [LYKINS.GLENDO]

STRAT1.DAT;5

Total of 1 file.
$
```

If your save set encompasses more than one magnetic tape or sequential disk volume, it is possible to begin restore and compare operations without mounting the first volume of the save set. However, if you use the /IMAGE qualifier, processing must begin with the first volume. If the tape that you mount is not the first volume in the save set, you will receive the warning message:

```
%BACKUP-W-NOT1STVOL, tape 'name' is not the start of a save set
```

If you restore a small number of files from a large save set, it is a good idea to use the /LOG qualifier. This enables you to monitor the files as they are restored. BACKUP will continue processing until it reaches the end of the save set. Once the files you need have been restored, you can press CTRL/Y to terminate processing.

You can use the following command qualifiers in a BACKUP restore operation:

/BRIEF[1]	/FULL[1]	/IMAGE[1]
/INCREMENTAL	/[NO]INITIALIZE[1]	/LIST[=filespec][1]
/[NO]LOG[1]	/PHYSICAL[1]	/RECORD[1]
/[NO]TRUNCATE[1]	/VERIFY[1]	/VOLUME=n[1]

[1]Can be used with standalone BACKUP

2.3.4 Comparing Files

You can perform a BACKUP compare operation by using the /COMPARE qualifier. In a compare operation, both file specifications are input specifiers. You cannot perform a compare operation in conjunction with a copy, save, or restore. You can, however, use /COMPARE with /LIST.

You can use the BACKUP compare either to compare a save set with files on disk, or to compare files on disk with other files on disk. Note that the /COMPARE qualifier should be used only to compare a save set against original files or to compare files or volumes copied using BACKUP. BACKUP processes files by blocks. Comparing files that were not produced by BACKUP may cause errors, even though the file contents otherwise appear identical.

You can compare a save set with files on disk as in the following example (this command directs BACKUP to compare the contents of the save set 2MAR1555.BCK with the directory [LYKINS]):

```
$ BACKUP/COMPARE TAPE:2MAR1555.BCK [LYKINS]
```

The following example compares files on disk; note that in this example, there is an inconsistency in block 16 between UPLIFT.EXE;4 and UPLIFT.EXE;3:

```
$ BACKUP/COMPARE UPLIFT.EXE;3 UPLIFT.EXE;4
%BACKUP-E-VERIFYERR, verification error for block 16 of WRKD$:[LYKINS]UPLIFT.EXE;4
```

To compare two entire Files–11 volumes, you should use an image compare operation as follows:

```
$ BACKUP/IMAGE/COMPARE DBA1: DBA2:
```

In addition to /COMPARE, the following qualifiers can be associated with a BACKUP compare operation:

/BRIEF	/FAST[1]	/FULL
/IMAGE	/LIST[=filespec]	/[NO]LOG
/PHYSICAL	/VOLUME=n	

[1] *Cannot* be used with standalone BACKUP

See the command qualifier section for a description of the /COMPARE qualifier.

2.3.5 Listing Files

You can use the /LIST command qualifier to list information about files in a save set, either at the terminal or to a specified output file. BACKUP can perform this operation in conjunction with any other BACKUP operation, or by itself.

The following command lists save set information at the terminal:

```
$ BACKUP/LIST 2MAR1555.BCK
```

To list the same information in a file named INFO.LIS, enter the following command:

```
$ BACKUP/LIST=INFO.LIS 2MAR1555.BCK
```

You can use the following command qualifiers with a BACKUP list operation:

/BRIEF /FULL

The /FULL qualifier cannot be used with standalone BACKUP.

See the command qualifier section for a description of the /LIST qualifier.

3 BACKUP Media

This section describes the use of backup media. Sections 3.1 through 3.4 discuss the types of media that can contain BACKUP save sets; Section 3.5 explains protection of save sets; and Section 3.6 describes the use of multivolume save sets.

You can write save sets to the following types of media:

- Magnetic tape
- Files–11 disk
- Remote Files–11 disk
- Sequential disk

3.1 Magnetic Tape Save Sets

Magnetic tape must be mounted with the DCL command MOUNT/FOREIGN. (For detailed information on mounting volumes, refer to the *VAX/VMS Mount Utility Reference Manual*). In general, you do not have to initialize magnetic tape volumes when you use them in BACKUP operations. However, if you are creating an output save set on a magnetic tape that has a non-ANSI label, or on a blank magnetic tape that has never been initialized, include the /REWIND qualifier in the BACKUP command that creates the save set. The /REWIND qualifier rewinds the tape to the beginning-of-tape (BOT) marker before the BACKUP operation is performed. Alternatively, you can initialize the tape with the DCL command INITIALIZE instead of using the /REWIND qualifier (the default BACKUP behavior is /NOREWIND).

You can use more than one tape device at a time to save or restore data; this allows processing to continue on another tape while the one most recently used is rewinding. If no save-set name is given for an input magnetic tape, the first save set encountered on the tape will be read. For more information about magnetic tape volumes, see Section 3.6.

3.2 Files–11 Disk Save Sets

To write save sets on a Files–11 disk, you must use the /SAVE_SET output save-set qualifier. The /SAVE_SET qualifier indicates to BACKUP that you want to create a save set on the output volume, rather than a copy of the selected files. The disk must be mounted as a Files–11 volume; all volumes in a volume set must be mounted.

3.3 Remote Save Sets

You can create or access a save-set file on a remote node by specifying a node name (and an access control string, if one is required) in a save-set specification. You must include the /SAVE_SET qualifier after the output specifier. The following example creates a save set on the remote node DOUBLE. (An access control string consists of your user name and password for the remote node within quotation marks between the remote node name and the pair of colons.)

```
$ BACKUP [MYDIR] DOUBLE"jones abrakadabra"::DBA0:SAVEIT.BCK/SAVE_SET
```

Omit the access control string if it is not required to gain access to the remote node, for example, in the case of proxy network access.

3.4 Sequential-Disk Save Sets

Sequential-disk save sets allow you to treat a Files–11 disk volume the same way you treat a magnetic tape save set. The primary advantage of using sequential-disk save sets is that you can mount multivolume save sets one volume at a time; this is particularly useful on systems without tape that have a large fixed-media disk and a small removable disk. When one sequential disk is full, BACKUP prompts you for another disk, as it would for save sets on magnetic tape.

To write sequential-disk save sets, you must mount the output disk using the DCL command MOUNT/FOREIGN. Although the disk is mounted with the /FOREIGN qualifier, the Backup Utility manages the disk using Files–11 structure. When you perform a save operation, you must use the /SAVE_SET output save-set qualifier. You must not specify a directory name for the save set; save sets are entered in the master file directory on the disk. The user privilege LOG_IO is required to read or write a multivolume sequential-disk save set. You can use more than one disk device at a time to save or restore data; this allows processing to continue on another disk while the one most recently used is spinning down.

BACKUP does not initialize the first sequential-disk volume, as the default is /NOINITIALIZE; however, continuation volumes are always initialized. Unless you use the /INITIALIZE qualifier, the following restrictions apply to the output volume:

- The disk must be Files–11 Structure Level 2.
- The disk must not be part of a volume set.
- The cluster factor of the disk must be 1.
- The free space on the disk cannot be fragmented into more than 100 pieces.
- The index file cannot be extended.
- The master file directory cannot be extended.

The effect of these restrictions is to limit the number of save sets on a volume to approximately 12.

Volumes that are to be used for sequential-disk save sets should be either freshly initialized or should contain only save sets. Volumes that have been used for general file processing are usually unsuitable for sequential disk use. Sequential-disk format is designed for handling relatively large save sets on relatively small disks. In a situation where a large number of small save sets are to be placed on a disk, you should use Files–11 disk save sets (see Section 3.2).

You can read a sequential-disk save set in either of two ways: as a sequential-disk save set (mounted with the /FOREIGN qualifier) or as a normal Files–11 save set.

If a save set is read as a sequential-disk save set, one volume can be mounted at a time (as you can in creating a sequential-disk save set). The default directory for the save set file specification is the directory [000000] the master file directory on the disk).

If a save set is read as a normal Files–11 save set, all volumes of the save set must be mounted (as is true for any Files–11 volume set). The default directory is your process default directory, so to read the save set, you must specify the directory [000000].

Save-set files written to a Files–11 disk can also be read in sequential mode. To do so, you must specify the directory from which the save set is to be read. This mode of operation is useful when you are using standalone BACKUP. If the save set was written to a volume set using Files–11 disk structure, you must observe the following rules:

- All volumes of the volume set must be mounted. You must mount the volumes with the /FOREIGN qualifier. (If you are using standalone BACKUP, the volumes are implicitly mounted.)
- When you specify the volumes in the input specifier, you must specify the names of the devices in the same order as the relative volume numbers of the volumes mounted on those devices. For example, the volumes named USER01 and USER02 in a volume set are mounted on two drives, DRA3 and DRA5. The save-set specification for the volume set must be DRA3:[directory]save-set-name.ext;v, DRA5:.

3.5 Multivolume Save Sets

When you create a save set on magnetic tape or sequential disk, you may be requested to mount another volume. When the end-of-tape marker (EOT) is reached or the disk is full, BACKUP puts the drive off line. (Note that not all disk drives can be put off line under program control.) If you are using magnetic tape, BACKUP rewinds the tape. You then receive the following messages:

```
%BACKUP-I-RESUME, resuming operation on volume 'number'
%BACKUP-I-READYWRITE, mount volume 'number' on 'device' for writing
Respond with YES when ready:
```

Remove the full volume, and load another unused volume on the drive. Enter YES when the volume has been loaded. On disk devices, enter YES when the device is up to speed and the ready light is on.

When you are reading a save set, you receive messages in the form

```
%BACKUP-I-RESUME, resuming operation on volume 'number'
%BACKUP-I-READYREAD, mount volume 'number' on 'device' for reading
Respond with YES when ready:
```

Remove the current volume from the drive, and load the next volume in the set. Enter YES when the volume has been loaded (and the ready light is on).

After you mount a volume and enter YES, processing continues normally.

You must have the user privilege LOG_IO to process multiple sequential-disk volumes in this manner. No special privilege is required for magnetic tape.

If you are using magnetic tape or sequential-disk volumes, you can specify more than one device in the command, and have a volume ready in the next device on the list. When using magnetic tape, you will receive only one message:

```
%BACKUP-I-RESUME, resuming operation on volume 'number'
```

You are always prompted for sequential-disk volumes, because many disk drives cannot be unloaded under program control.

If you have a large amount of data to back up, you may find that you can optimize your time savings by using the multivolume feature with magnetic tape. Once a magnetic tape volume is full, BACKUP rewinds it while writing to the continuation volume on the second drive. You can then mount a fresh magnetic tape on the first drive; when the second volume is full, BACKUP immediately resumes processing on the first drive.

If you invoke the Backup Utility from a batch job, the magnetic tape mounting messages READYREAD, READYWRITE, and WRITENABLE, are displayed at terminals enabled to receive operator's messages. Terminals enabled with REPLY/ENABLE=TAPES receive messages for magnetic tape operations, and terminals enabled with REPLY/ENABLE=DISKS receive messages for sequential-disk operations. Terminals enabled with REPLY /ENABLE=CENTRAL receive messages for both operations. (For information on enabling terminals with the REPLY/ENABLE command, see the *VAX/VMS DCL Dictionary*. The Backup Utility will continue processing when you reply to the requests using the DCL command REPLY/TO. If you respond with REPLY/PENDING, the Backup Utility will wait until a REPLY/TO command is entered. If you respond with REPLY/ABORT, or with any other qualifier to REPLY, the fatal error %BACKUP-F-OPERFAIL causes BACKUP to terminate. For further information about the DCL command REPLY, refer to the *VAX/VMS DCL Dictionary*).

3.6 Protecting a BACKUP Save Set

The output save-set qualifiers /PROTECTION and /OWNER_UIC allow you to specify the protection and owner UIC for a save set. These qualifiers can be used with save sets stored on magnetic tape, sequential disk, or Files–11 disk. These qualifiers will prevent nonprivileged users from mounting a save set volume or accessing a Files–11 save set.

Note that once a user has access to a save set, a user can read any data contained in the save set.

4 Standalone BACKUP

Standalone BACKUP is a version of the Backup Utility that runs from memory without the control of the VAX/VMS operating system. Therefore, you must bootstrap standalone BACKUP before you can use it. Standalone BACKUP employs a subset of BACKUP qualifiers and only performs image and physical operations (you must specify the /PHYSICAL qualifier for a physical operation). Standalone BACKUP can be bootstrapped from the console block storage device or from a Files–11 disk.

Before you bootstrap standalone BACKUP from a Files–11 disk, you must first copy the necessary standalone BACKUP files to the disk. To copy the files, use the command procedure SYS$UPDATE:STABACKIT.COM. This command procedure prompts you for a target device and places the files in the directory [SYSEXE] on the target device. If the directory [SYSEXE] does not already exist on the target device, it is created. You can have the target device allocated, and it can optionally be mounted. The user privileges CMKRNL, CMEXEC, LOG_IO, SYSNAM, VOLPRO, and OPER (or the user privilege SETPRV) are required to use STABACKIT.COM. The command procedure lists the standalone BACKUP files at your terminal as they are copied. When all of the necessary files have been copied, the following message is displayed:

```
Kit is complete.
```

Before running standalone BACKUP, you should read the descriptions of the /IMAGE and /PHYSICAL qualifiers.

To bootstrap standalone BACKUP from a Files–11 disk, use the nonstop bootstrap command for your VAX processor. The bootstrap device must be the device on which the disk containing standalone BACKUP is mounted. For instructions on bootstrapping standalone BACKUP from the console block storage device and performing specific tasks, refer to the *VAX/VMS System Manager's Reference Manual*.

Following are the qualifiers that can be used with standalone BACKUP:

Command Qualifiers	Default
/BRIEF	*/BRIEF*
/COMPARE	*None.*
/FULL	*/BRIEF*
/IMAGE	*None.*
/[NO]INITIALIZE	*See text.*
/LIST[=filespec	*See text.*
/[NO]LOG	*/NOLOG*
/PHYSICAL	*None.*
/RECORD	*None.*
/[NO]TRUNCATE	*/NOTRUNCATE*
/VERIFY	*None.*
/VOLUME=n	*None.*

Input Save-Set Qualifiers	Default
/[NO]CRC	*/CRC*
/[NO]REWIND	*/NOREWIND*
/SAVE_SET	*None.*

Output Save-Set Qualifiers	Default
/BLOCK_SIZE=n	*See text.*
/COMMENT=string	*None.*
/[NO]CRC	*/CRC*
/DENSITY=n	*See text.*
/GROUP_SIZE=n	*/GROUP_SIZE=10*
/LABEL=(string[,...])	*None.*
/OWNER_UIC=[uic]	*See text.*
/PROTECTION[=(code)]	*See text.*
/[NO]REWIND	*/NOREWIND*
/SAVE_SET	*None.*

5 BACKUP Fatal Error Options

When the Backup Utility encounters a fatal error, it issues a *BACKUP-I-SPECIFY* error message followed by a prompt for recovery action as follows:

```
BACKUP>
```

The options are CONTINUE, RESTART, and QUIT, depending on the particular error condition. Not all options are available for all errors.

If you select the CONTINUE option, BACKUP ignores the error and continues processing as if the error never occurred. If you select the RESTART option, BACKUP restarts the operation at the beginning of the current save-set volume. If you select the QUIT option, the BACKUP operation terminates.

If BACKUP is running interactively, enter the option in response to the prompt on SYS$COMMAND. If BACKUP is executed as a batch job, use the DCL command REPLY to enter the option.

The CONTINUE option should be used only if the position of the magnetic tape has not changed since the original error and the error does not imply that data has already been lost (for example, if an operator accidentally hits the offline button). BACKUP detects that the magnetic tape has gone off line and issues the BACKUP-I-SPECIFY message. If the drive is placed back on line and the CONTINUE option is specified, BACKUP then resumes the save operation from where it left off.

If you select the RESTART option in response to a BACKUP-I-SPECIFY prompt during a save operation, a new magnetic tape must be mounted. After the new magnetic tape is mounted, BACKUP restarts the save operation from where it was when the original reel was mounted. For example, if an excessive error rate occurs on volume 3 of a magnetic tape save set and you specify RESTART after the BACKUP-I-SPECIFY message, the save operation restarts at the beginning of the new volume 3; no data is lost.

Note: Use of the CONTINUE option may result in the loss of some data at the point where the error occurred.

COMMAND QUALIFIERS

The following sections provide detailed descriptions, including examples, of each BACKUP qualifier. Command qualifiers are presented first, input-specifier qualifiers second, and output-specifier qualifiers third.

Command qualifiers modify the default action of a BACKUP command and can be placed anywhere in the command line. Input- and output-specifier qualifiers modify the way in which BACKUP handles input and output specifiers. Input-specifier qualifiers must be placed immediately after the input specifier; output-specifier qualifiers must be placed immediately after the output specifier.

There are two types of input- and output-specifier qualifiers: file qualifiers and save-set qualifiers. Input file-selection qualifiers can be applied to files from either a Files–11 volume or a BACKUP save set. Output file qualifiers can be applied only to files on a Files–11 volume. Save-set qualifiers, whether input or output, can be used only with save sets.

/BRIEF

Causes the /LIST command qualifier to list only the file specification, size, and creation date for each file.

FORMAT

/LIST/BRIEF *save-set-spec*

DESCRIPTION

The /BRIEF qualifier is valid only when used with the /LIST qualifier, and is the default format for output produced by the /LIST qualifier. The file name listed includes the file type and version number, size (in blocks), and creation date for each file. You may want to use /BRIEF if you have changed the default for the /LIST qualifier.

The /BRIEF qualifier is ignored unless the /LIST command qualifier is specified.

EXAMPLE

This BACKUP command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set:

```
$ BACKUP/LIST/BRIEF DBA2:[SAVE]23MAR82.BCK/SAVE_SET
```

Note that the /SAVE_SET qualifier is required to identify the input specifier as a save set on a Files–11 medium.

/BUFFER_COUNT=n

Specifies the number of I/O buffers to be used in the operation.

FORMAT

/BUFFER_COUNT=*n input-specifier output-specifier*

DESCRIPTION

The default for n is 3; the maximum valid buffer count is 5. A buffer count that is larger than the default may improve performance when you are working with streaming tape drives such as the TU80.

EXAMPLE

```
$ BACKUP/BUFFER_COUNT=4/IMAGE DBA0: MTA0:SAVE.BCK
```

This command performs an image save operation using a pool of four buffers.

/COMPARE

Causes the contents of the input specifier to be compared with the contents of the output specifier.

FORMAT

/COMPARE *file-spec file-spec*

DESCRIPTION

In a BACKUP compare operation, no save, restore, or copy operation is performed. The first specifier can be a BACKUP save set or a disk volume. The second specifier must be a disk volume. Unless you also specify the /PHYSICAL qualifier, the disk volume must be a Files–11 volume. Magnetic tape and sequential-disk volumes must be mounted with the /FOREIGN qualifier.

If a comparison is to be made between files on disks, both files must be stored on Files–11 media. If a comparison is to be made between a save set and files on disk, the first specifier must be a save set and the second specifier must be a Files–11 volume.

If you do not specify a version number with the file specification, the default is ;* (the asterisk wildcard), which causes all versions of the file to be processed.

Note that both specifiers in a compare operation are input specifiers. The second specifier works in a manner similar to that of an output directory wildcard. If you are comparing two entire Files–11 volumes, you should use an image compare operation as follows:

```
$ BACKUP/IMAGE/COMPARE DBA1: DBA2:
```

Compare operations can also be performed using the /PHYSICAL qualifier to compare physical save sets against disk volumes, or to compare two disk volumes (a physical compare operation compares disk volumes in terms of logical blocks). In this case, disk volumes must be mounted using the /FOREIGN qualifier.

Note that the /COMPARE qualifier should only be used to compare a save set against original files or to compare files or volumes copied using BACKUP. BACKUP processes files by blocks. Comparing files that were not produced by BACKUP is likely to cause mismatch errors in files that are apparently identical.

EXAMPLES

1

```
$ BACKUP/COMPARE JAZZ.DAT BLUES.DAT
```

This example shows how you can compare two Files–11 files. Since no version number is specified, BACKUP will process all versions of each file in this command line.

2

```
$ BACKUP/COMPARE/IMAGE MTA0:SWING.BCK DBA2:
```

This example compares an image save set and a Files–11 volume.

/DELETE

Specifies that a BACKUP save or copy operation is to delete the selected input files after all the files have been successfully processed.

FORMAT

/DELETE *file-spec save-set-spec*

DESCRIPTION

The /DELETE qualifier is valid only when used in a BACKUP save or copy operation. Note, however, that /DELETE cannot be used in conjunction with the /RECORD qualifier.

Sufficient user privilege is required to delete files; if you do not have sufficient privilege, files that are protected against deletion will not be deleted.

EXAMPLES

1
```
$ BACKUP/DELETE BOP.DAT MTAO:BOP.BCK
```

In this example, the file BOP.DAT will be deleted after the save set BOP.BCK is successfully created on MTA0.

2
```
$ BACKUP/DELETE RAY.DAT,JOE.DAT,ELLA.DAT MTAO:OSCAR.BCK
```

BACKUP will delete the selected list of files in this example after saving them to OSCAR.BCK on MTA0.

/FAST

Causes the BACKUP operation to process an input Files–11 medium using a fast file scan to reduce processing time.

FORMAT

/FAST *input-specifier output-specifier*

DESCRIPTION

A fast file scan is most useful when the input specifier includes most of the files on the volume, and additional selection qualifiers, such as those that pertain to date or owner, specify a relatively small set of the files named. Because image operations implicitly use the fast file scan, the /FAST qualifier is ignored if used with the /IMAGE qualifier.

The fast file scan reads the index file on the medium and creates a table of the files that match the qualifiers you have specified.

To perform a fast file scan, you need write access to the INDEXF.SYS file on the input medium, or the input medium must be write-locked. This requirement is necessary because BACKUP opens the index file to synchronize with the file system, whether or not any update is made.

EXAMPLE

```
$ BACKUP/FAST DBA1:[*...] MTAO:13NOVBAK.BCK,MTA1:
```

In this example, the entire contents of the disk DBA1 are saved to a multireel tape save set. The /FAST qualifier is used to reduce processing time.

/FULL

Causes file information produced by the /LIST command qualifier to be written in the format provided by the DCL command DIRECTORY /FULL.

FORMAT

/LIST/FULL *input-specifier [output-specifier]*

DESCRIPTION

The /FULL command qualifier is ignored unless the /LIST command qualifier is specified. If the /FULL qualifier is not specified with /LIST, only the file specification, size, and creation date of each file are listed (the default action of the /LIST command is the action supplied by the /BRIEF qualifier).

EXAMPLE

```
$ BACKUP/LIST/FULL MTA1:ROCK.BCK
```

The command in this example will list in full format the files in save set MTA1:ROCK.BCK.

/IGNORE=option

Specifies that a BACKUP save or copy operation is to override restrictions placed on files.

FORMAT

/IGNORE=*option input-specifier output-specifier*

DESCRIPTION

The /IGNORE=option qualifier has two options:

INTERLOCK	Processes files that otherwise could not be processed because of file access conflicts. This option can be used to save or copy files that are currently open for writing. Note that no synchronization is made with the process writing the file, so the file data that is copied might be inconsistent with the input file, depending on the circumstances (for example, if another user is editing the file, the contents might change). When a file open for writing is processed, BACKUP issues the message: %BACKUP-W-ACCONFLICT, 'filename' is open for write by another user. The INTERLOCK option is especially useful if you have files that are open so much of the time that they might not otherwise be backed up. The use of this option requires the user privilege SYSPRV, a system UIC, or ownership of the volume.
NOBACKUP	Saves or copies the contents of files that are marked with the NOBACKUP flag by the /NOBACKUP qualifier to the DCL command SET FILE. If /IGNORE=NOBACKUP is not used, files marked with the NOBACKUP flag are processed, (all information necessary to recreate the files is saved), but the actual contents of the files are not saved.

EXAMPLE

```
$ BACKUP/IGNORE=INTERLOCK [SUSAN...] MTAO:SONGBIRD.BCK
```

This command saves an entire directory tree and the files in all subdirectories, including any files that are open.

/IMAGE

Directs BACKUP to perform an image operation.

FORMAT

/IMAGE *input-specifier output-specifier*

DESCRIPTION

An image operation processes the whole volume or volume set, and allows users to create a functionally equivalent copy of the input volume or volume set. The input and output specifiers in an image operation must be device names. To use the /IMAGE command qualifier, you need write access to both the volume index file (INDEXF.SYS) and the bit map file (BITMAP.SYS); alternatively, the input medium must be write-locked. The reason for this requirement is that BACKUP opens the index file to synchronize with the file system (no update is made).

In save and copy operations you cannot use other file selection qualifiers with the /IMAGE command qualifier. All files on the input disk volumes are saved or copied, except files that have been marked NOBACKUP by the DCL command SET FILE (see the preceding description of the /IGNORE qualifier). Reserved files and lost files (files that have no directory entry) are included in the save or copy operation.

In restore and copy operations, every file is restored or copied. The output volume must be mounted using the /FOREIGN qualifier. The new volume is a functionally equivalent copy of the input volume; however, the file placement will change. In volume sets (more than one volume), the number of volumes in the output specifier must be equal to the number of volumes in the input volume set.

An image restore or copy operation initializes the output volume or volume set. The initialization data comes from the input volume unless the /NOINITIALIZE qualifier is used. Using the /NOINITIALIZE qualifier directs BACKUP to initialize the output volume using volume initialization data on that volume. You cannot change structure level in an image restore or copy.

EXAMPLES

1

```
$ MOUNT/FOREIGN DBA2:
%MOUNT-I-MOUNTED, COPYDISK       mounted on NODE$DBA2:
$ BACKUP/IMAGE DBA1: DBA2:
```

This command copies the disk volume DBA1 to volume DBA2. Note that the output disk is mounted with the /FOREIGN qualifier, as is necessary for an image copy operation.

BACKUP
/IMAGE

2
```
$ MOUNT/FOREIGN DMA1:
%MOUNT-I-MOUNTED, IMAGEDISK      mounted on NODE$DMA1:
$ BACKUP/IMAGE/LOG DLA2: DMA1:
%BACKUP-S-CREATED, created DMA1:[000000]000000.DIR;1
%BACKUP-S-CREATED, created DMA1:[000000]BACKUP.SYS;1
%BACKUP-S-CREATED, created DMA1:[000000]CONTIN.SYS;1
%BACKUP-S-CREATED, created DMA1:[000000]CORIMG.SYS;1
%BACKUP-S-CREATED, created DMA1:[000000]ELLA.DIR;1
%BACKUP-S-CREATED, created DMA1:[ELLA]SCAT.DAT;1
%BACKUP-S-CREATED, created DMA1:[000000]JOE.DIR;1
%BACKUP-S-CREATED, created DMA1:[JOE]STRINGS.DAT;1
%BACKUP-S-CREATED, created DMA1:[000000]OSCAR.DIR;1
%BACKUP-S-CREATED, created DMA1:[OSCAR]KEYS.DAT;1
%BACKUP-S-CREATED, created DMA1:[000000]VOLSET.SYS;1
    .
    .
    .
$
```

The MOUNT/FOREIGN command prepares the target disk for the image copy operation. The /LOG qualifier on the BACKUP command displays information about each file copied.

3
```
$ BACKUP/IMAGE DBA2: MTA0:ET.BCK,MTA1:
```

This BACKUP command saves an entire disk volume to a multivolume save set on two magnetic tape drives.

4
```
$ MOUNT/OVERRIDE=IDENTIFICATION DBA1:
%MOUNT-I-MOUNTED, SAVEDISK       mounted on NODE$DBA1:
$ BACKUP/IMAGE WORKDISK DBA1:28SEP.BCK/SAVE_SET
```

The MOUNT command prepares a Files–11 disk for processing; the /OVERRIDE=IDENTIFICATION qualifier allows the disk to be mounted without a label specification. The BACKUP command performs an image save operation to sequential disk.

/INCREMENTAL

Allows you to restore a disk volume from a save set created with the /IMAGE qualifier and a series of incremental save sets.

FORMAT

/INCREMENTAL *save-set-spec disk-device-name*

DESCRIPTION

When processed correctly, the output disk volume will contain the same files it contained when the most recent incremental backup was performed. Files that were deleted in the period in which the series of incremental backups were performed are not created on the output disk volume. The /INCREMENTAL qualifier is valid only in restore operations. The output specifier must specify a device only; file specifications are not allowed. Also, input file-selection qualifiers and selective file specifications are not allowed in incremental restore operations.

For best results you should maintain full volume backups (using the /IMAGE qualifier) and perform frequent incremental backups. To restore the volume, restore from the image save set using the /IMAGE and /RECORD qualifiers. The /RECORD qualifier directs BACKUP to write the date the volume was backed up into the backup date field of the file header of each newly created file and directory. Then, apply the incremental save sets, using the /INCREMENTAL qualifier; start with the most recent save set. The order in which you apply the incremental save sets will not affect the final structure of the output volume; however, the most efficient order in which to apply the incremental save sets is reverse chronological order.

When the /INCREMENTAL qualifier is used, the /OWNER_UIC=ORIGINAL qualifier is assumed; therefore, you do not need to specify /OWNER_UIC unless you want to change the original UICs. The /INCREMENTAL qualifier can be used only on Files–11 Structure Level 2 volumes.

EXAMPLE

If you have been performing a combination of full and incremental backups on a public volume, you must use a procedure such as the following to recover the volume from its backups.

First, the volume must be restored from the last full backup with an image restore operation.

```
$ MOUNT/FOREIGN DRAO:
%MOUNT-I-MOUNTED, SCRATCH mounted on _DRAO:
$ MOUNT/FOREIGN MTAO:
%MOUNT-I-MOUNTED, FULLMA mounted on _MTAO:
$ MOUNT/FOREIGN MTA1:
%MOUNT-I-MOUNTED, FULL02 mounted on _MTA1:
$ BACKUP/IMAGE/RECORD MTAO:FULLJUN82,MTA1 DRAO:
%BACKUP-I-RESUME, resuming operation on volume 2
%BACKUP-I-RESUME, resuming operation on volume 3
%BACKUP-I-RESUME, resuming operation on volume 4
    .
    .
    .
$ DISMOUNT MTAO:
$ DISMOUNT MTA1:
$ DISMOUNT/NOUNLOAD DRAO:
```

Note that the /RECORD qualifier is necessary to perform the operation correctly.

Next, the disk must be mounted as a file-structured volume and the incremental backups applied in reverse chronological order. You should start with the last daily backup; then apply the preceding daily backups, and finally the weekly backups, as follows:

```
$ MOUNT DRAO: PUBLIC
%MOUNT-I-MOUNTED, PUBLIC mounted on _DRAO:
$ MOUNT/FOREIGN MTAO: INCD17
%MOUNT-I-MOUNTED, INCD17 mounted on _MTAO:
$ BACKUP/INCREMENTAL MTAO:INCD17JUN DRAO:
$ DISMOUNT MTAO:
    .
$ MOUNT/FOREIGN MTAO: INCD16
%MOUNT-I-MOUNTED, INCD16 mounted on _MTAO:
$ BACKUP/INCREMENTAL MTAO:INCD16JUN DRAO:
$ DISMOUNT MTAO:
    .
$ MOUNT/FOREIGN MTAO: INCD15
%MOUNT-I-MOUNTED, INCD15 mounted on _MTAO:
$ BACKUP/INCREMENTAL MTAO:INCD15JUN DRAO:
$ DISMOUNT MTAO:
    .
$ MOUNT/FOREIGN MTAO: INCW14
%MOUNT-I-MOUNTED, INCW14 mounted on _MTAO:
$ BACKUP/INCREMENTAL MTAO:INCW14JUN DRAO:
$ DISMOUNT MTAO:
    .
$ MOUNT/FOREIGN MTAO: INCW7J
%MOUNT-I-MOUNTED, INCW7J mounted on _MTAO:
$ BACKUP/INCREMENTAL MTAO:INCW7JUN DRAO:
$ DISMOUNT MTAO:
```

Applying the latest incremental backup using the /INCREMENTAL qualifier causes the volume's directories to be restored to their state at the time the backup was taken. In addition, all the files in the incremental save set are restored. Files that are present on the volume from the full restore operation, but are not present in the directories of the incremental backup, are deleted. (These files were deleted by users during the time period between the full backup and the last incremental backup.)

In applying the earlier incrementals, BACKUP restores the remaining files that have directory entries on the volume. These are files that were last modified some time before the last incremental backup, and were still present when the last incremental backup was taken. Note that BACKUP will restore the volume correctly regardless of the order in which the incremental backups are applied; using reverse chronological order is most efficient. The /RECORD and /INCREMENTAL qualifiers must be used where shown to obtain the correct operation.

/INITIALIZE

Initializes an output disk volume.

FORMAT

/IMAGE/[NO]INITIALIZE *input-specifier*
output-specifier

DESCRIPTION

The /[NO]INITIALIZE qualifier is valid only when used with the /IMAGE qualifier on restore or copy operations, or when writing to a sequential-disk save set.

When used with the /IMAGE qualifier, the /INITIALIZE qualifier directs BACKUP to initialize the volume using volume initialization data from the input volume. The /NOINITIALIZE qualifier directs BACKUP to reinitialize the output volume using the existing initialization data on that volume; the output volume must have been previously initialized as a Files–11 volume. Any existing data on the volume is lost. The structure level of the volume must be the same structure level as the save set being restored. For image operations on Files–11 volumes, the default is /INITIALIZE.

When used in writing to sequential-disk save sets, the /INITIALIZE qualifier directs BACKUP to reinitialize the output volume. The /NOINITIALIZE qualifier directs BACKUP not to reinitialize the volume. Its use is analogous to the use of the BACKUP/NOREWIND command with magnetic tape. For operations on sequential-disk volumes, the default is /NOINITIALIZE.

EXAMPLE

```
$ BACKUP/IMAGE/NOINITIALIZE DBA0: DBA2:
```

This command causes the output volume DBA2 to be reinitialized using the existing data on that volume.

/INTERCHANGE

Directs BACKUP to process files in a manner suitable for data interchange (software distribution).

FORMAT

/INTERCHANGE *input-specifier output-specifier*

DESCRIPTION

The effects of the /INTERCHANGE qualifier are as follows:

- Directories not selected as files are not copied.
- Access control lists are not copied.
- Block size on magnetic tape is limited to 8,192 bytes.
- Normal error recovery is used to write magnetic tapes so that there are no bad records on the resulting magnetic tape.

EXAMPLE

```
$ BACKUP/RECORD/INTERCHANGE [ACCOUNTS]/SINCE=BACKUP MFA0:SAVACC.BCK
```

The command in this example saves all files in the directory [ACCOUNTS] that have been modified since the last BACKUP/RECORD operation. The /INTERCHANGE qualifier ensures that the processed files are suitable for data interchange.

/JOURNAL

Specifies that a BACKUP save operation is to create, or append information to, a BACKUP journal file. Lists the contents of a BACKUP journal file when combined with the /LIST qualifier.

FORMAT

/JOURNAL*[=file-spec] input-specifier output-specifier*

DESCRIPTION

The BACKUP journal file contains a record of backup operations and the saved files. If the specified journal file does not exist, it is created; if the journal file does exist, the new journal information is appended to the existing journal file. If you want to start a new journal file, you can also create a zero-length file (using the DCL command CREATE or a text editor). If the file specification is omitted, the default is SYS$DISK:BACKUP.BJL; if the file type is omitted, the default file type is BJL. The file specification cannot include a node name.

The /JOURNAL qualifier can also be used with the /LIST qualifier to list the contents of a BACKUP journal file. You must not specify an input or output specifier with a BACKUP/JOURNAL/LIST command. The file-selection qualifiers /BEFORE, /SINCE, /EXCLUDE, and /SELECT can be used with the /LIST qualifier to search for specific files. Note that the /BEFORE and /SINCE qualifiers refer to the time at which the save set was created, not the time at which the saved files were created.

Journal files are not created for physical mode operations.

EXAMPLE

```
$ BACKUP/JOURNAL=LAR.BJL [LARRY]*.*;* MFA0:YET.BCK
```

The BACKUP command saves all versions of all files in the directory [LARRY] to the save set YET.BCK on MFA0. The /JOURNAL qualifier creates a record of the saved files (LAR.BJL) in the current default directory.

/LIST

Causes information about the files in a save set to be written to the named output file.

FORMAT

/LIST*[=file-spec] save-set-spec*

DESCRIPTION

You can use the /LIST qualifier with any operation (save, restore, copy, or compare).

If the /LIST qualifier is not being used in a save, restore, copy, or compare operation, the input specifier must refer to a save set, and the output specifier must be omitted. When you use the /LIST qualifier with standalone BACKUP, if you direct output to a file (/LIST=file-spec), the file specification must reference either a terminal or a printer.

You can use either the /BRIEF or /FULL qualifier with the /LIST qualifier. The /BRIEF qualifier directs BACKUP to list each file's size in blocks, and its creation date. The /FULL qualifier directs BACKUP to list additional information about each file in the form of the DCL command DIRECTORY/FULL. The default is /BRIEF. If no file specification is given, the default is SYS$OUTPUT.

Do not use /LOG together with /LIST when the output for /LIST is directed to SYS$OUTPUT; you will receive confusing output.

EXAMPLE

```
$ BACKUP/LIST DBA2:[SAVE]23MAR82.BCK/SAVE_SET
```

This BACKUP command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set. Note that the /SAVE_SET qualifier is required to identify the input specifier as a save set on a Files–11 medium.

/LOG

Determines whether the file specification of each file processed is displayed at SYS$OUTPUT during the operation. The default is /NOLOG.

FORMAT

/LOG *input-specifier output-specifier*
/NOLOG *input-specifier output-specifier*

EXAMPLE

```
$ BACKUP/LOG [SAVE]23MAR82.BCK/SAVE_SET DBA2:[PLI.WORK]
```

In this example, the file specifications of the files that are restored to the directory are logged to SYS$OUTPUT.

/PHYSICAL

Specifies that a backup operation is to ignore any file structure on the volume.

FORMAT

/PHYSICAL *input-specifier output-specifier*

DESCRIPTION

BACKUP saves, restores, copies, or compares the entire volume in terms of logical blocks.

An output disk must not have a bad block in any location that corresponds to a good block on the input disk. In addition, an output disk must be the same type of device as the input disk; for example, a BACKUP/PHYSICAL operation cannot be performed between an RP05 input disk and an RP06 output disk.

A save set written using the /PHYSICAL qualifier can only be read as a physical save set; conversely, a file-structured save set can only be read with file-structured restore or compare operations.

An output disk that is to be treated as a physical volume must have been mounted using the DCL command MOUNT/FOREIGN; an input disk must be mounted using the DCL command MOUNT/FOREIGN, or the user must have the user privilege LOG_IO.

The input and output specifiers for physical volumes must be device names.

Note: BACKUP/PHYSICAL does not copy the first track (track 0) of RX01 and RX02 floppy disks; DIGITAL does not support track 0.

EXAMPLES

1
```
$ BACKUP/PHYSICAL DYA0:  DYA1:
```

This BACKUP command copies the entire RX02 floppy disk mounted on device DYA0: to the RX02 floppy disk mounted on device DYA1:. Both devices must have been mounted with the DCL command MOUNT /FOREIGN.

2
```
$ BACKUP/PHYSICAL MTA0:28SEP.BCK DBA1:
```

This command restores a Files–11 volume from a physical save set.

/RECORD

Records the current date and time in the backup date field of each file header once the save set is successfully processed.

FORMAT

/RECORD *input-specifier output-specifier*

DESCRIPTION

The /RECORD qualifier can be used only on Files–11 Structure Level 2 volumes. The user privilege SYSPRV is required to use the /RECORD qualifier on files other than those owned by your UIC.

If the /RECORD qualifier is used in a copy or restore operation, the date and time that the save set was created is written in the backup date field of the file header of each copied or restored file.

If /RECORD is not specified, the backup date field of each processed file remains unchanged.

The /RECORD qualifier cannot be used in conjunction with the /DELETE qualifier.

EXAMPLE

```
$ BACKUP/RECORD  DBA1:[*...]/SINCE=BACKUP MTA0:13MAY.BCK
```

This command saves all files on DBA1 that have been created or modified since the last backup, and records the current date and time in each file header.

/TRUNCATE

Controls whether a copy or restore operation truncates a sequential output file at the end-of-file when creating it. By default, a copy or restore operation uses the allocation of the input file to determine the size of the output file.

FORMAT

/TRUNCATE *input-specifier output-specifier*
/NOTRUNCATE *input-specifier output-specifier*

EXAMPLE

```
$ BACKUP/TRUNCATE MFA0:20JUL.BCK DMA0:[*...]/OWNER_UIC=[630,16]
```

This command restores the save set file on MFA0 to a volume mounted on DMA0, truncates the output files at the EOF, and assigns each file a UIC of [630,16].

/VERIFY

Specifies that the contents of the output specifier be compared with the contents of the input specifier after a save, restore, or copy operation is completed.

FORMAT

/VERIFY *input-specifier output-specifier*

DESCRIPTION

On file-structured copy operations, each file is compared after it has been copied. On physical copy operations, the volume is compared after it has been copied. On save and restore operations, each save set volume is compared after it has been processed. If a file does not compare successfully, an error message reporting this fact is displayed.

For a save or restore operation, the verification is performed in a separate pass, starting with a %BACKUP-I-STARTVERIFY message. For a copy operation, each file is verified as it is processed; no message is displayed.

Note that the use of this command qualifier is different from that of the /COMPARE qualifier, which is used to compare the contents of two Files–11 disks or a save set and files on a disk (/COMPARE cannot be used as a command qualifier in a save, restore, copy, or list operation).

The /VERIFY qualifier does not work on a restore or copy operation when the /NEW_VERSION output file qualifier is also used. Because the /NEW_VERSION qualifier reassigns output file versions, it is not possible to correctly associate the created output files with the input files from which they were copied.

EXAMPLE

```
$ BACKUP/VERIFY/LOG *.LIS MFA0:LIST.BCK
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRE.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRETIME.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]EXC.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]NOREB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]REB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]SETREB.LIS;1
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]VERS.LIS;1
%BACKUP-I-STARTVERIFY, starting verification pass
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]CRE.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]CRETIME.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]EXC.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]NOREB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]REB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]SETREB.LIS;1
%BACKUP-S-COMPARED, compared DISK$DEFAULT:[WONDER]VERS.LIS;1
```

In this example, the BACKUP command creates a magnetic tape save set on MFA0 and starts the verification pass after the save operation is completed. The /LOG qualifier displays the file names as they are processed.

/VOLUME

Indicates that a specific disk volume in a disk volume set is to be processed. The /VOLUME qualifier is valid only when used with the /IMAGE qualifier.

FORMAT

/IMAGE/VOLUME=*n input-specifier output-specifier*

DESCRIPTION

Without the /VOLUME qualifier, an image copy operation of a multivolume disk set requires two disk drives for every volume in the set (since both the input and output volume sets have to be fully mounted). However, if you use the /VOLUME qualifier, you only need one more drive than the number of volumes in the set. When you use the /VOLUME qualifier, you must write-lock the entire volume set for consistent results.

In save operations the save set contains the segments of the files located on the specified volume. The input volume set must be fully mounted. The save set can be restored only with the /VOLUME qualifier.

In copy operations the output volume is a functionally equivalent copy of the selected relative volume.

In restore operations the input save set must have been created using the /IMAGE qualifier. The input save set can be either an image save set of a full disk volume set, or a selected volume save set created with the /VOLUME qualifier. You cannot use the /NOINITIALIZE qualifier in a restore operation with the /VOLUME qualifier.

In a selected volume compare operation between two disk volume sets, both volume sets must be fully mounted. In a selected volume compare operation between a save set on tape and a disk volume set, the disk volume set must be fully mounted.

EXAMPLE

```
$ BACKUP/IMAGE/VOLUME=3 DRA0: DRA1:
```

This command creates a functionally equivalent copy of the third volume of a volume set mounted on DRA0 (one volume at a time); the volume mounted on DRA1 becomes the third volume of the image-copy volume set.

INPUT FILE-SELECTION QUALIFIERS

Use input file-selection qualifiers to define which files from the input specifier are to be selected for a save, restore, copy, or compare operation. If you do not use input file-selection qualifiers, every file in the input specifier is processed. Note that input file-selection qualifiers cannot be used in image operations.

/BACKUP

Selects files according to the backup date written by BACKUP /RECORD.

FORMAT

input-specifier **/BEFORE=***time***/BACKUP** *output-specifier*

input-specifier **/SINCE=***time***/BACKUP** *output-specifier*

DESCRIPTION

This qualifier is valid only when used with the /BEFORE or /SINCE qualifier. Only files that have been backed up before or since the date specified with the /BEFORE or /SINCE qualifier are selected.

If used with the /BEFORE file selection qualifier, only those files that have a backup date earlier than the specified /BEFORE date or time are selected.

If used with the /SINCE file selection qualifier, only those files that have a backup date equal to or later than the specified /SINCE date or time are selected.

The system time recorded for each file is the actual time each file was last saved or copied using the /RECORD command qualifier.

Use the /BACKUP file selection qualifier only with Files–11 Structure Level 2 volumes. You cannot use /BACKUP with the /CREATED, /MODIFIED, or /EXPIRED file-selection qualifiers because their functions are mutually exclusive.

EXAMPLES

1
```
$ BACKUP [PAYROLL]*.*;*/BEFORE=01-SEP-1985/BACKUP  MTA1:SEP01.BCK
```

BACKUP saves all versions of all files in the directory [PAYROLL] that have a backup date written before September 1, 1985.

2
```
$ BACKUP [ACCOUNTS...]/SINCE=YESTERDAY/BACKUP  MTA1:ACC.BCK
```

In this example, BACKUP saves all files in all subdirectories of [ACCOUNTS] that have a backup date written since yesterday (24 hours before 00:00:00.0 o'clock today).

/BEFORE

Processes files dated earlier than the specified time.

FORMAT

input-specifier/**BEFORE=***time output-specifier*

DESCRIPTION

You can use the /BACKUP, /CREATED, /EXPIRED, or /MODIFIED qualifier with the /BEFORE qualifier; /MODIFIED is the default. The time option can be either a delta time or an absolute time with the format [dd-mmm-yyyy[:]][hh:mm:ss.cc], or one of the following:

BACKUP	The backup date of the file written by a previous BACKUP/RECORD operation (available only on Files–11 Structure Level 2 volumes)
TODAY	The current day, month, and year at 00:00:00.0 o'clock
TOMORROW	24 hours after 00:00:00.0 o'clock today
YESTERDAY	24 hours before 00:00:00.0 o'clock today

The date used for comparison is the backup date, creation date, expiration date, or modified date in each file's header record. Which date is used depends on which of these input file-selection qualifiers is used: /BACKUP, /CREATED, /EXPIRED, or /MODIFIED. If none of these qualifiers is specified, the modified date is used.

EXAMPLE

```
$ BACKUP [POLICIES]*.*;*/BEFORE=TODAY/EXPIRED  DMA1:OLDPOL.BCK/SAVE_SET
```

This command saves all files in the directory [POLICIES] that have expiration dates preceding today's date.

/CONFIRM

Displays prompts on SYS$COMMAND for confirmation before processing each file. If you want the file to be processed, enter Y or YES, and press RETURN; if you enter anything else BACKUP does not process the file.

FORMAT

input specifier/**CONFIRM** *output specifier*

EXAMPLE

```
$ BACKUP *.LIS/CONFIRM/LOG  DLA2:LIST.BCK/SAVE_SET
DISK$DEFAULT:[WONDER]CRE.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRE.LIS;1
DISK$DEFAULT:[WONDER]CRETIME.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]CRETIME.LIS;1
DISK$DEFAULT:[WONDER]EXC.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]EXC.LIS;1
DISK$DEFAULT:[WONDER]REB.LIS;1, copy? (Y or N): N
DISK$DEFAULT:[WONDER]SETREB.LIS;1, copy? (Y or N): Y
%BACKUP-S-COPIED, copied DISK$DEFAULT:[WONDER]SETREB.LIS;1
DISK$DEFAULT:[WONDER]VERS.LIS;1, copy? (Y or N): RET
    .
    .
    .
$
```

The BACKUP command looks for all files with a file type of LIS, and prompts for confirmation on each before saving it to LIST.BCK on DLA2. The /LOG qualifier displays information about each file as it is processed. Note that the SAVE_SET qualifier is necessary for the sequential-disk save set.

/CREATED

Causes each file to be selected according to the value of the file creation date field in its file header.

FORMAT

input-specifier /**BEFORE=***time*/**CREATED**
output-specifier
input-specifier /**SINCE=***time* /**CREATED**
output-specifier

DESCRIPTION

Use this qualifier with the /BEFORE qualifier or the /SINCE qualifier. These qualifiers provide the system time value used to determine whether a file is processed.

Do not use this qualifier with the /BACKUP, /MODIFIED, or /EXPIRED qualifier. The functions of the /CREATED qualifier and any of these qualifiers are mutually exclusive.

EXAMPLE

```
$ BACKUP *.GNC/SINCE=YESTERDAY/CREATED DLA2:[SAVEDIR]/SAVE_SET)
```

The command in this example saves all files with a file type of GNC that have been created since yesterday (24 hours before 00:00:00.0 o'clock today).

/EXCLUDE

Causes file(s) that otherwise meet the selection criteria to be excluded from selection.

FORMAT

input-specifier **/EXCLUDE=***(file-spec[,...])*
output-specifier

DESCRIPTION

You can use standard VAX/VMS wildcard characters with the /EXCLUDE qualifier.

If you specify more than one file, separate the file specifications by commas and enclose the list in parentheses. Do not use a device specification to specify an excluded file.

Note that you can use only one /EXCLUDE qualifier in a single command line; you cannot specify a list of directories with a separate /EXCLUDE=(filespec, . . .) entry for each directory.

Note that BACKUP does not apply temporary file specification defaults within the list. Each file specification independently takes its defaults from the file specification [000000 . . .]*.*;*. You cannot use zero or negative version numbers with the /EXCLUDE qualifier.

EXAMPLE

```
$ BACKUP DRA2:[CONTRACTS]/BEFORE=TODAY/EXCLUDE=(*.OBJ,*.MAI) MFA0:CONTRACT.BCK
```

All files in the directory [CONTRACTS] that have a modification date prior to today (the current day, month and year at 00:00:00.0 o'clock) are saved to the save set CONTRACT.BCK on drive MFA0, except for those with a file type of .OBJ or .MAI.

/EXPIRED

Causes each file to be selected according to the value of the file expiration date field in its file header.

FORMAT

input-specifier **/BEFORE=***time***/EXPIRED** *output-specifier*

input-specifier **/SINCE=***time***/EXPIRED** *output-specifier*

DESCRIPTION

Use this qualifier with the /BEFORE or /SINCE qualifier. These qualifiers provide the system time value used to determine whether a file is processed.

Do not use this qualifier with the /BACKUP, /MODIFIED, or /CREATED qualifier. The functions of /EXPIRED and any of these qualifiers are mutually exclusive.

EXAMPLE

```
$ BACKUP [CONTRACTS]/BEFORE=TOMORROW/EXPIRED MTA1:30DEC.BCK
```

This command saves all files in the directory [CONTRACTS] that have an expiration date prior to tomorrow (24 hours after 00:00:00.0 o'clock today).

/MODIFIED

Causes each file to be selected according to the value of the date-last-modified field in its file header.

FORMAT

input-specifier **/BEFORE=***time***/MODIFIED** *output-specifier*

input-specifier **/SINCE=***time***/MODIFIED** *output-specifier*

DESCRIPTION

Use this qualifier with the /BEFORE or /SINCE qualifier. These qualifiers provide the system time value used to determine whether a file is processed.

Do not use this qualifier with the /BACKUP, /CREATED, or /EXPIRED qualifier. The functions of /MODIFIED and any of these qualifiers are mutually exclusive.

EXAMPLE

```
$ BACKUP [SUNDANCE...]/BEFORE=TODAY/MODIFIED MFA1:MOD.BCK
```

This command saves all files in the directory tree of the root [SUNDANCE], whose modification dates precede today (00:00:00.0 o'clock of the current day, month, and year).

/OWNER_UIC

Causes files owned by the specified UIC to be processed.

FORMAT

input-specifier/**OWNER_UIC**[=*[uic]*] *output-specifier*

DESCRIPTION

A UIC must be specified as octal numbers, in the form [g,m]. Note that the brackets are required.

[g,m]

g is an octal number in the range 0 through 37776 representing the group number

m is an octal number in the range 0 through 177776 representing the member number

If this qualifier is specified without a UIC, the default UIC is that of the current process. If this qualifier is not specified, all UICs on the volume are processed.

EXAMPLES

1
```
$ BACKUP [SUNDANCE]/OWNER_UIC=[727,49]  DRIVE1:STABLE.BCK/SAVE_SET
```

All files with an owner UIC of [727,49] in the directory [SUNDANCE] are saved to the sequential-disk save set STABLE.BCK on DRIVE1:.

2
```
$ BACKUP [SNOW...]/OWNER_UIC MT$DRIVE:SNOW.BCK
```

In this example, all files that are owned by the user in the directory and subdirectories of [SNOW] are saved to SNOW.BCK on the magnetic tape drive MT$DRIVE.

/SINCE

Selects only those files dated equal to or later than the time specified.

FORMAT

input-specifier/**SINCE**=*time output-specifier*

DESCRIPTION

You can use the /BACKUP, /CREATED, /EXPIRED, or /MODIFIED qualifier with the /SINCE qualifier; /MODIFIED is the default. The time option can be either a delta time or an absolute time with the format [dd-mmm-yyyy[:]][hh:mm:ss.cc], or one of the following:

BACKUP	The backup date of the file written by a previous BACKUP/RECORD operation (available only on Files–11 Structure Level 2 volumes)
TODAY	The current day, month, and year at 00:00:00.0 o'clock
TOMORROW	24 hours after 00:00:00.0 o'clock today
YESTERDAY	24 hours before 00:00:00.0 o'clock today

The date used for comparison is the backup date, creation date, expiration date, or modified date in each file's header record. Which date is used depends on which of these input file-selection qualifiers is used: /BACKUP, /CREATED, /EXPIRED, or /MODIFIED. If none of these qualifiers is specified, the modified date is used.

EXAMPLE

```
$ BACKUP [PLI.WORK]/SINCE=YESTERDAY/MODIFIED [PLI.SAV]
```

This command copies selected files in the directory [PLI.WORK] to the directory [PLI.SAV]. Only those files that have been modified since 24 hours preceding 00:00:00.0 o'clock today are processed. Note that the /MODIFIED qualifier is not required, as its action is the default when the /SINCE qualifier is specified.

INPUT SAVE-SET QUALIFIERS

The BACKUP qualifiers described in the following section are used with input save sets.

/CRC

Specifies that the software Cyclic Redundancy Check (CRC) is to be performed.

FORMAT

input-save-set-spec/**[NO]CRC** *output-specifier*

DESCRIPTION

The default is /CRC. To disable CRC checking, specify /NOCRC; note that use of the /NOCRC qualifier reduces processing time at the risk of increasing data error.

EXAMPLE

```
$ BACKUP MTA2:928SAVE.BCK/NOCRC []
```

This command restores the save set 928SAVE.BCK to the current default directory; the /NOCRC qualifier disables Cyclic Redundancy Checking.

/REWIND

Causes the input tape reel to be rewound (/REWIND) or not rewound (/NOREWIND) to the beginning-of-tape (BOT) marker before BACKUP searches for the save-set name specified in the input specifier.

FORMAT

input-save-set-spec/**[NO]REWIND** *output-specifier*

DESCRIPTION

Use this qualifier only for magnetic tape save sets. The /NOREWIND qualifier is the default.

EXAMPLE

```
$ BACKUP MFA1:CONTRACTS.BCK/REWIND/NOCRC DBA2:[*...]/OWNER_UIC=ORIGINAL
```

In this example, the save set CONTRACTS.BCK is restored to the disk volume mounted on DBA2. The /REWIND qualifier causes the magnetic tape to rewind to BOT before performing the operation, the /NOCRC qualifier disables CRC checking, and the /OWNER_UIC output qualifier restores the original owner UICs.

/SAVE_SET

Directs BACKUP to treat the input file as a BACKUP save set.

FORMAT

input-save-set-spec/**SAVE_SET** *output-specifier*

DESCRIPTION

The /SAVE_SET qualifier allows you to refer to a BACKUP save set on a Files–11 medium located on either a local system or on a remote VAX/VMS system by means of DECnet–VAX. Normally, an input specifier that refers to disk is treated as a Files–11 medium, and an input specifier that refers to tape is treated as a BACKUP save set.

The /SAVE_SET qualifier is also used with sequential-disk save sets. For more information on sequential-disk save sets, see Section 3.4.

EXAMPLES

1
```
$ BACKUP DBA2:[BACKUP]1212MAR3.BCK/SAVE_SET DBA1:[*...]
```

This command restores a file in a backup save set on disk to a Files–11 disk.

2
```
$ BACKUP/LIST DBA2:[SAVE]23MAR82.BCK/SAVE_SET
```

This BACKUP command lists the BACKUP summary information and the file name, size, and creation date for each file in the save set. Note that the /SAVE_SET qualifier is required to identify the input specifier as a save set on a Files–11 medium.

3
```
$ BACKUP/LOG [SAVE]23MAR82.BCK/SAVE_SET [PLI.WORK]/REPLACE
```

This command restores the directory that was listed in example 2. The file specifications of the files that are restored to the directory are logged to SYS$OUTPUT. Note that the /REPLACE qualifier is used to delete existing copies of files in the directory and replace them with the files of the same name, type, and version number.

/SELECT

Causes only those file(s) specified to be processed.

FORMAT

input-save-set-spec **/SELECT=***(file-spec[,...])*
output-specifier

DESCRIPTION

If you specify more than one file, separate the file specifications with commas and enclose the list in parentheses. Do not use a device specification when you define the files to be selected. You can use standard wildcard characters.

Note that BACKUP does not apply temporary file specification defaults within the list. Each file specification independently takes its defaults from the file specification [000000 . . .]*.*;*. You cannot use zero or negative version numbers with the /SELECT qualifier.

EXAMPLE

```
$ BACKUP DBA1:JUL20.BCK/SAVE_SET/SELECT=[SNOW]BALL.PAS [WINTER.GAME]BALL.PAS
```

This command selects a file named [SNOW]BALL.PAS from a sequential-disk save set and restores it to the directory [WINTER.GAME] on the current default device.

OUTPUT FILE QUALIFIERS

The qualifiers described in this section are used with output file specifications. Note that none of these can be used in an image operation.

/NEW_VERSION

If BACKUP attempts to copy or restore a file when a file with an identical directory name, file name, type, and equal or higher version number already exists, a new file is created with the same name and type, and a version number one higher than the highest existing version.

FORMAT

input-specifier output-specifier/**NEW_VERSION**

DESCRIPTION

If you omit this qualifier and the version number is identical, BACKUP reports an error in copying the file and no replacement is made.

Note that when copying or restoring files using the /NEW_VERSION qualifier, files are processed in decreasing version number order, and created in ascending order. The result is that the version numbers are inverted.

Because this qualifier causes version numbers to change, its use with the /COMPARE or /VERIFY qualifiers will cause unpredictable results.

EXAMPLE

```
$ BACKUP MTA1:NOV30REC.BCK/SELECT=*.DAT [RECORDS...]/NEW_VERSION
```

The BACKUP command in this example restores the save set NOV30REC.BCK to the directory [RECORDS]. The input qualifier /SELECT specifies that only those files with a file type of DAT are to be processed; the output qualifier /NEW_VERSION instructs BACKUP to restore each *.DAT file regardless of whether another version already exists.

/OVERLAY

If BACKUP attempts to copy or restore a file when a file with an identical directory name, file name, type, and version number already exists, the new version of the file is written over the existing version.

FORMAT

input-specifier output-specifier/**OVERLAY**

DESCRIPTION

The physical location of the file on disk does not change. If the /OVERLAY qualifier is specified, and the new file is larger than the one already present, BACKUP allocates more free blocks on the disk and extends the file. If you omit this qualifier, BACKUP reports an error in copying the file and no replacement is made.

EXAMPLE

```
$ BACKUP DRA1:MAR30SAV.BCK/SAVE_SET [RECORDS...]/OVERLAY
```

The sequential-disk save set MAR30SAV.BCK is restored to the directory [RECORDS]. If a file from the save set has a specification that is identical to another that already exists in [RECORDS...], the output qualifier directs BACKUP to write over the existing version.

/OWNER_UIC

Causes a redefinition of the owner UIC for each file restored during the operation.

FORMAT

input-specifier output-specifier/**OWNER_UIC***[=option]*

DESCRIPTION

One of the following options can be selected:

default	Sets the owner UIC to the user's current default UIC. This option is the default if the /OWNER_UIC qualifier is not specified, except in image and incremental restore operations, when ORIGINAL is the default option.
ORIGINAL	Retains the owner UIC of the file being restored. This option is the default if the /OWNER_UIC qualifier is specified, but no option is selected. This option is also the default for incremental restore operations. To use this option, the UIC must be yours, or you must have the SYSPRV user privilege, or you must be the owner of the output volume.
PARENT	Sets the owner UIC to the owner UIC of the directory to which the file is being restored or copied. To use this option, the parent UIC must be yours, or you must have the SYSPRV user privilege, or you must be the owner of the output volume.
[uic]	Sets the owner UIC to the UIC specified. Use the [g,m] format (as described in the /OWNER_UIC input file-selection qualifier). To use this option, the UIC must be yours, or you must have the SYSPRV user privilege, or you must be the owner of the output volume.

In backup operations where the /IMAGE or /INCREMENTAL qualifier is specified, the default is /OWNER_UIC=ORIGINAL.

EXAMPLE

```
$ BACKUP DBA2:ACCOUNTS.BCK/SAVE_SET [CLEAVER...]/OWNER_UIC=PARENT
```

In this example, the sequential-disk save set ACCOUNTS.BCK is restored to the directory tree [CLEAVER...], assigning each restored file the owner UIC of the [CLEAVER] directory.

/REPLACE

If BACKUP attempts to copy or restore a file when a file with an identical directory name, file name, type, and version number already exists, the existing version of the file is deleted and a new version is created. If you omit this qualifier, BACKUP reports the error and no replacement is made.

FORMAT

input-specifier output-specifier/**REPLACE**

EXAMPLE

```
$ BACKUP TAPE:SAVEWORK.BCK/SELECT=[LEE...] WORK:[LEE...]/REPLACE
```

The command in this example restores a directory tree (and all files in the tree) from a magnetic tape save set to disk. The /SELECT qualifier specifies the directory to be selected from the save set, and the /REPLACE qualifier instructs BACKUP to delete any duplicate versions of files that already exist on the disk.

OUTPUT SAVE-SET QUALIFIERS

The output qualifiers described in this section can be applied only to backup save sets.

/BLOCK_SIZE

Specifies the output block size in bytes.

FORMAT

input-specifier output-save-set-spec/**BLOCK_SIZE**=*n*

DESCRIPTION

The minimum block size is 2048 bytes; the maximum block size is 65,024 bytes. The actual block size written is adjusted using the constraints of the BACKUP format. On magnetic tapes, BACKUP ignores any block size defined by the /BLOCKSIZE qualifier to the DCL command MOUNT. A block cannot be rounded up over the maximum block size. The default block size for magnetic tape is 8192 bytes; the default for disk is 32,256 bytes.

If the block size is set to a large value for a save set on magnetic tape, it is possible for the magnetic tape to run off its reel or for a large number of write errors to be logged. If this occurs, avoid using large block sizes. If the problem recurs with the same magnetic tape, avoid using that tape for future BACKUP operations.

EXAMPLE

```
$ BACKUP/RECORD DRA2:[LEE...]/SINCE=BACKUP TAPE:SAVEWORK.BCK/BLOCK_SIZE=10000
```

The BACKUP command saves a directory tree on DRA2 to a magnetic tape mounted on drive TAPE. The input qualifier /SINCE instructs BACKUP to process only those files in the specified tree that have been modified since the last BACKUP/RECORD operation. The output qualifier /BLOCKSIZE directs BACKUP to assign a block size of 10,240 (BACKUP always rounds the specified block size up to the next multiple of 512).

/COMMENT

Places a comment in an output save set. If the string is longer than one word, or if it contains nonalphanumeric characters, it must be surrounded by quotation marks (").

FORMAT

input-specifier output-save-set-spec
/COMMENT=*string*

EXAMPLE

```
$ BACKUP [REMARKS] DRIVE:20JULREM.BCK/SAVE_SET -
_$ /COMMENT="There's nothing you can save that can't be saved"
$ BACKUP/LIST DRIVE:20JULREM.BCK/SAVE_SET
Listing of save set

Save set:           20JULREM.BCK
Written by:         WALRUS
UIC:                [999,999]
Date:               20-JUL-1985 14:22:06.62
Command:            BACKUP [REMARKS] DRIVE:20JULREM.BCK/SAVE_SET/COMMENT=There's
nothing you can save that can't be saved
Operating system:   VAX/VMS Version V4.0
BACKUP version:     V4
CPU ID register:    0138084C
Node name:          _ABBEY::
Written on:         _ABBEY$DMA1:
Block size:         32256
Group size:         10
Buffer count:       3

[REMARKS]BAC.RES;1                                  2  30-JUL-1985 14:13
[REMARKS]COM.LIS;1                                  1  30-JUL-1985 14:04
[REMARKS]DTOP.DIR;1                                 1  30-JUL-1985 14:18
    .
    .
    .
Total of 40 files, 535 blocks
End of save set
```

The BACKUP command saves the directory [REMARKS] to a sequential-disk save set and records a comment. The BACKUP/LIST command displays the contents of the newly created save set. Note that the /SAVE_SET qualifier is required in any reference to a save set on disk.

/CRC

Specifies whether the software Cyclic Redundancy Check (CRC) is to be computed and stored in the data blocks of the save set.

FORMAT

input-specifier output-save-set-spec/**[NO]CRC**

DESCRIPTION

The default is /CRC. To disable checking, use /NOCRC; note that use of the /NOCRC qualifier reduces processing time at the risk of increasing data error.

EXAMPLE

```
$ BACKUP/RECORD []/SINCE=BACKUP MTA2:928SAVE.BCK/NOCRC
```

This command saves all files in the current default directory that have been modified since the last BACKUP/RECORD operation to the save set 928SAVE.BCK; the output qualifier /NOCRC disables Cyclic Redundancy Checking.

/DENSITY

Specifies the recording density of the output magnetic tape, in terms of bits per inch (bpi).

FORMAT

input-specifier output-save-set-spec/**DENSITY**=*n*

DESCRIPTION

The value given must be one that your magnetic tape hardware supports. If you omit this qualifier, the default density is the current one on the drive addressed.

EXAMPLE

```
$ BACKUP *.PAS MTA2:SAVEPAS.BCK/DENSITY=800
```

All files with a file type of PAS in the current default directory are saved to the save set SAVEPAS.BCK on drive MTA0. The /DENSITY output qualifier sets the recording density at 800 bpi.

/GROUP_SIZE

Defines the number of blocks BACKUP places in each redundancy group.

FORMAT

input-specifier output-save-set-spec/**GROUP_SIZE=***n*

DESCRIPTION

Using the redundant information, BACKUP can correct one "uncorrectable" read error in each redundancy group. The value of n can be from 0 through 100. The default value for this qualifier is 10.

If you define a value of 0 for /GROUP_SIZE, no redundancy groups are created for the save set.

EXAMPLE

```
$ BACKUP/RECORD DBA1:[*...]/SINCE=BACKUP TAPE:SAVEWORK.BCK/GROUP_SIZE=20
```

The BACKUP command saves all files in the current default directory tree that have been modified since the last BACKUP/RECORD operation; the /GROUP_SIZE output qualifier defines the redundancy group size as 20.

/LABEL

Specifies the volume label for a save set written on magnetic tape or sequential disk.

FORMAT

input-specifier output-save-set-spec
/LABEL=*(string[,...])*

DESCRIPTION

For save sets written on magnetic tape, the volume label string may be one to six alphanumeric characters.

For save sets written on sequential-disk volumes, the volume label string may be one to twelve alphanumeric characters.

If you do not specify the /LABEL qualifier, the label will be derived from the save-set name. In a multivolume disk save set, the volume set name will be the save-set name. The label of each volume in the volume set will be either the label string or the label string derived from the save-set name and followed by a two-digit volume number, starting with 01.

If you specify a list of labels, BACKUP will label save-set volume n with label n in the list of labels. If the list of labels is shorter than the number of volumes in the save set, BACKUP will generate labels for the remaining volumes using the first label in the list followed by a two-digit relative volume number. Note that for magnetic tape save sets, the volumes are counted, starting (at 01) with the tape on which the current save set started. Magnetic tape volume numbers are not maintained across multiple save sets written on multiple magnetic tapes.

EXAMPLE

```
$ BACKUP [PAYROLL] TAPE:30NOV.BCK/LABEL=PAY
```

The directory [PAYROLL] is saved to the save set 30NOV.BCK on the magnetic tape drive labeled TAPE; the /LABEL output qualifier specifies the volume label PAY.

/OWNER_UIC

Specifies the owner UIC of the save set.

FORMAT

input-specifier output-save-set-spec
/OWNER_UIC=*[uic]*

DESCRIPTION

If the /OWNER_UIC qualifier is omitted, the UIC of the current process is used. To use this qualifier on Files–11 save sets, you need the user privilege SYSPRV, or the UIC must be your own.

A UIC must be specified as octal numbers, in the form [g,m]. Note that the brackets are required.

[g,m]

g is an octal number in the range 0 through 37776 representing the group number

m is an octal number in the range 0 through 177776 representing the member number

In backup operations where the /IMAGE or /INCREMENTAL qualifier is specified, the default is /OWNER_UIC=ORIGINAL.

EXAMPLE

```
$ BACKUP [CLEAVER...] MFA2:ACCOUNTS.BCK/OWNER_UIC=[3,3]
```

In this example, the directory tree [CLEAVER...] is saved to ACCOUNTS.BCK on the magnetic tape drive MFA2. The output qualifier /OWNER_UIC assigns an owner UIC of [3,3] to the save set.

/PROTECTION

Defines the protection to be applied to the save set.

FORMAT

input-specifier output-save-set-spec
/PROTECTION *[=(code)]*

DESCRIPTION

The code indicates the type of access (read, write, execute, and delete) available to the four categories of users (system, owner, group, and world). For more information on specifying the protection code, see the *VAX/VMS DCL Concepts Manual*.

If the save set is written to either a Files–11 disk or a sequential disk, and the /PROTECTION qualifier is not specified, the default is the process default protection.

If the save set is written to magnetic tape and the /PROTECTION qualifier is not specified, no protection is given to the tape. If the /PROTECTION qualifier is specified without specifying a code, the default is the process default protection.

Any protection categories not specified are defaulted to your process default protection.

EXAMPLE

```
$ BACKUP [CLEAVER...] MFA2:ACCOUNTS.BCK/OWNER_UIC=[3,3] -
_$ /PROTECTION=(S:RWE,O:RWED,G:RE,W)
```

The directory tree [CLEAVER...] is saved to ACCOUNTS.BCK on the magnetic tape drive MFA2. The /OWNER_UIC qualifier assigns an owner UIC of [3,3] to the save set. The /PROTECTION qualifier assigns the owner of the save set READ, WRITE, EXECUTE, and DELETE access. SYSTEM users are assigned READ, WRITE, and EXECUTE access; GROUP users are assigned READ and EXECUTE access; and WORLD users are assigned no access.

/REWIND

Specifies whether an output magnetic tape is to be rewound before processing begins. The default is /NOREWIND.

FORMAT

input-specifier output-save-set-spec/[NO]REWIND

DESCRIPTION

The /REWIND output save-set qualifier directs BACKUP to rewind a magnetic tape volume to the beginning-of-tape (BOT) marker before it writes the output save set. Therefore, any current data on the tape will be overwritten. If /REWIND is not used, BACKUP proceeds to the logical end-of-tape (EOT) marker and begins to write the output save set there. If the logical EOT is also the physical end of the tape, BACKUP requests a new tape on which to continue processing. Note that you cannot start a new save set at the end of a tape that currently ends with a save set that is continued on to another tape.

EXAMPLE

```
$ BACKUP *.RNO TAPE:DSRSAVE.BCK
$ BACKUP/LIST TAPE:DSRSAVE.BCK/REWIND
Listing of save set

Save set:           DSRSAVE.BCK
Written by:         SNOW
UIC:                [016,360]
Date:                1-AUG-1985 21:36:27.92
Command:            BACKUP *.RNO TAPE:DSRSAVE.BCK
Operating system:   VAX/VMS Version 4.0
BACKUP version:     V4
CPU ID register:    01B83007
Node name:          _SHADOW::
Written on:         _$2$MTA0:
Block size:         8192
Group size:         10
Buffer count:       3

[SNOW.BOOK.MEM]2111APA.RNO;2                15  24-JUN-1985 09:36
[SNOW.BOOK.MEM]2111APB.RNO;2                 6  24-JUN-1985 09:36
[SNOW.BOOK.MEM]2111APC.RNO;2                 7  24-JUN-1985 09:36
[SNOW.BOOK.MEM]2111APD.RNO;2                 3  24-JUN-1985 09:36
[SNOW.BOOK.MEM]2111CH1.RNO;2                17   1-JUL-1985 15:32
[SNOW.BOOK.MEM]2111CH2.RNO;2                71   1-JUL-1985 15:34
[SNOW.BOOK.MEM]2111CH3.RNO;2                88   1-JUL-1985 15:38
[SNOW.BOOK.MEM]2111CH4.RNO;2                99   1-JUL-1985 15:44
[SNOW.BOOK.MEM]2111CH5.RNO;2                61  24-JUN-1985 09:36
[SNOW.BOOK.MEM]2111CPR.RNO;1                 3  23-APR-1985 14:48

Total of 10 files, 317 blocks
End of save set
```

The first command in this example saves all files with a file type of RNO in the current default directory to the magnetic tape save set DSRSAVE.BCK. The second command performs a list operation on the save set. The /REWIND qualifier is necessary; if it were not included in the command line, BACKUP would begin its search at the point where the save operation ended.

/SAVE_SET

Directs BACKUP to treat the output file as a backup save set.

FORMAT

input-specifier output-save-set-spec/**SAVE_SET**

DESCRIPTION

Normally, an output specifier that refers to disk is treated as a Files–11 medium, and an output specifier that refers to tape is treated as a backup save set. The /SAVE_SET qualifier allows you to create a backup save set on a Files–11 medium located on either a local system or on a remote VAX/VMS system with DECnet.

You must specify the /SAVE_SET qualifier when the output specifier refers to a backup save set on disk.

The /SAVE_SET qualifier is also used with sequential-disk save sets. For more information on sequential-disk save sets see Section 3.4.

EXAMPLES

1
```
$ BACKUP [HILL] DBA1:[BACKUP]SEP28.BCK/SAVE_SET
```

The command in this example saves a directory to a save set on a Files–11 disk.

2
```
$ BACKUP DBA2:[PLI.WORK]*.*;[SAVE]23MAR82.BCK/SAVE_SET
```

This command saves the highest version of each file in directory [PLI.WORK] in a save set on SYS$DISK. The /SAVE_SET qualifier is required because the output save set is on a Files–11 medium.

BACKUP EXAMPLES

Table BACKUP-2 shows BACKUP command formats for save operations and some of the qualifiers you can use with a save operation.

Table BACKUP–2 Save Operation Quick Reference Table

Command Action	Command Format Command Example
Save a file to a save set on magnetic tape	**$ BACKUP file-spec save-set-specifier** **$ BACKUP STRATDAT1.DAT MTA0:STRATDAT1.BCK**
Save the most recent versions of files in a directory to magnetic tape	**$ BACKUP [directory]*.*; save-set-specifier** **$ BACKUP [LYKINS...]*.*; MTA0:1409MAR17.BCK**
Save a disk volume to a save set on magnetic tape	**$ BACKUP/IMAGE ddcu: save-set-specifier** **$ BACKUP/IMAGE DBA1: MTA0:930FEB4.BCK**
Save a disk volume to a multivolume save set on more than one magnetic tape drive	**$ BACKUP/IMAGE ddcu: save-set-specifier,ddcu:...** **$ BACKUP/IMAGE DBA1: MTA0:17MAR.BCK,MTA1:**
Save a list of files to a save set on magnetic tape	**$ BACKUP file-spec,file-spec,... save-set-specifier** **$ BACKUP DBA1:[LYKINS...]*.PAS,DMA0:[DAKOTA...]*.PAS MTA0:PAS17MAR.BCK**
Save a disk volume for incremental backups for the first time	**$ BACKUP/RECORD/IMAGE/LOG ddcu: save-set-specifier** **$ BACKUP/RECORD/IMAGE/LOG DBA1: MTA0:925FEB4.BCK**
Save a disk volume for incremental backups (not the first time)	**$ BACKUP/RECORD/FAST/LOG ddcu:[*...]/SINCE=BACKUP save-set-specifier** **$ BACKUP/RECORD/FAST/LOG DBA1:[*...]/SINCE=BACKUP MTA0:928FEB4.BCK**
Save an unstructured disk volume	**$ BACKUP/PHYSICAL ddcu: save-set-specifier** **$ BACKUP/PHYSICAL DMA1: MTA0:935FEB4.BCK**
Save a directory to a save set on a Files–11 disk	**$ BACKUP [directory] save-set-specifier/SAVE_SET** **$ BACKUP [LYKINS] DBA2:[BACKUP]1609FEB3.BCK/SAVE_SET**
Save a directory tree to a save set on magnetic tape	**$ BACKUP [directory...] save-set-specifier** **$ BACKUP [LYKINS...] MTA0:1612FEB3.BCK**
Save a directory tree to a save set on magnetic tape and output a listing	**$ BACKUP/LIST=file-spec [directory...] save-set-specifier** **$ BACKUP/LIST=8SEP.LOG [LYKINS...] MTA0:8SEP.BCK**

Table BACKUP-3 shows BACKUP command formats for restore operations and some of the qualifiers you can use with restore operations. In the examples in this table, it is assumed that save sets already exist on the magnetic tape and disk.

Table BACKUP–3 Restore Operation Quick Reference Table

Command Action	Command Format Command Example
Restore from save set on disk to Files–11 disk with original UICs	$ BACKUP save-set-specifier/SAVE_SET ddcu:[*...]/OWNER_UIC=ORIGINAL $ BACKUP DBA2:[BACKUP]1025FEB2.BCK/SAVE_SET DBA1:[*...]/OWNER_UIC=ORIGINAL
Restore from a save set on magnetic tape to a Files–11 disk with original UICs	$ BACKUP save-set-specifier ddcu:[*...]/OWNER_UIC=ORIGINAL $ BACKUP MTAO:1618FEB2.BCK DBA1:[*...]/OWNER_UIC=ORIGINAL
Restore a selected file in a save set on magnetic tape to a Files–11 disk	$ BACKUP save-set-specifier/SELECT=file-spec file-spec $ BACKUP MTAO:1618FEB2.BCK/SELECT=[POUDRE]UPLIFT.PAS [GEO.PAS]UPLIFT.PAS
Restore files with a specific UIC to a Files–11 disk	$ BACKUP save-set-specifier/OWNER_UIC=[uic] file-spec $ BACKUP MTAO:1641FEB2.BCK/OWNER_UIC=[360,052] [LYKINS...]
Restore files to a Files–11 disk with a new UIC	$ BACKUP save-set-specifier file-spec/OWNER_UIC=[uic] $ BACKUP MTAO:1641FEB2.BCK [TESTS...]/OWNER_UIC=[100,150]
Restore files to a Files–11 disk; if file exists, create new version	$ BACKUP save-set-specifier file-spec/NEW_VERSION $ BACKUP MTAO:1641FEB2.BCK [LYKINS...]/NEW_VERSION
Restore files to a Files–11 disk; if file exists, replace with new version	$ BACKUP save-set-specifier file-spec/REPLACE $ BACKUP MTAO:1641FEB2.BCK [LYKINS...]/REPLACE
Restore files to a Files–11 disk excluding certain files	$ BACKUP save-set-specifier/EXCLUDE=file-spec file-spec $ BACKUP MTAO:1641FEB2.BCK/EXCLUDE=[LYKINS.PAS] [LYKINS...]
Restore a directory tree, placing files in a different sub tree	$ BACKUP save-set-specifier/SELECT=[directory...] [directory2...] $ BACKUP MTAO:1641FEB2.BCK/SELECT=[FIELD...] [LYKINS.NEWDATA...]
Restore a Files–11 volume from a physical save set	$ BACKUP/PHYSICAL save-set-specifier ddcu: $ BACKUP/PHYSICAL MTAO:26MAR.BCK DMA3:
Restore a Files–11 volume from an image save set	$ BACKUP/IMAGE save-set-specifier ddcu: $ BACKUP/IMAGE MTAO:17AUG.BCK DRA3:
Restore a Files–11 volume, changing its initialization parameters	$ INITIALIZE ddcu: volume-name/new-parameters $ MOUNT/FOREIGN ddcu: $ BACKUP/IMAGE save-set-specifier ddcu:/NOINITIALIZE/TRUNCATE $ INITIALIZE DBA1: UTTLPACK/CLUSTER=5 $ MOUNT/FOREIGN DBA1: $ BACKUP/IMAGE MTAO:17AUG.BCK DBA1:/NOINITIALIZE/TRUNCATE

BACKUP
Examples

Table BACKUP-4 shows BACKUP command formats for copy operations, including some of the qualifiers you can use with a copy operation.

Table BACKUP–4 Copy Operation Quick Reference Table

Command Action	Command Format Command Example
Copy a directory tree to another directory tree	`$ BACKUP [directory...] [directory...]` `$ BACKUP [DAKOTA...] [SUNDANCE...]`
Copy a file to another file	`$ BACKUP file-spec file-spec` `$ BACKUP LOGIN.COM [.SAVE]OLDLOGIN.COM`
Copy a disk volume to another disk volume	`$ BACKUP/IMAGE ddcu: ddcu:` `$ BACKUP/IMAGE DBA1: DBA2:`
Copy a disk volume to another disk volume using the /PHYSICAL qualifier	`$ BACKUP/PHYSICAL ddcu: ddcu:` `$ BACKUP/PHYSICAL DYA1: DYA2:`
Copy two-disk volume set using the /IMAGE qualifier	`$ BACKUP/IMAGE volume-set-name ddcu:,ddcu:` `$ BACKUP/IMAGE USER$: DBA1:,DBA2:`

Table BACKUP-5 shows BACKUP command formats for compare operations, including some of the qualifiers you can use with a compare operation.

Table BACKUP–5 Compare Operation Quick Reference Table

Command Action	Command Format Command Example
Compare two Files–11 files	`$ BACKUP/COMPARE file-spec file-spec` `$ BACKUP/COMPARE UPLIFT.EXE;3 UPLIFT.EXE;2`
Compare a save set and a Files–11 file	`$ BACKUP/COMPARE save-set-specifier file-spec` `$ BACKUP/COMPARE MTAO:1618FEB2.BCK/SELECT=[POUDRE]UPLIFT.PAS UPLIFT.PAS`
Compare an image save set and Files–11 files	`$ BACKUP/COMPARE/IMAGE save-set-specifier ddcu:` `$ BACKUP/COMPARE/IMAGE MTAO:12OCT.BCK DRA3:`

Table BACKUP-6 shows BACKUP command formats for a list operation, including some of the qualifiers you can use with a list operation.

Table BACKUP–6 List Operation Quick Reference Table

Command Action	Command Format Command Example
List the files in a save set at the terminal	`$ BACKUP/LIST save-set-specifier` `$ BACKUP/LIST MTAO:1618FEB2.BCK`
List the files in a save set, write to a file	`$ BACKUP/LIST=file-spec save-set-specifier` `$ BACKUP/LIST=NEWLIST.LIS MTAO:1618FEB2.BCK`
List the files in a save set in full format	`$ BACKUP/LIST/FULL save-set-specifier` `$ BACKUP/LIST/FULL MTAO:1618FEB2.BCK`

List selected files in a journal file	`$ BACKUP/LIST/JOURNAL=journal-name/selection-qualifiers`
	`$ BACKUP/LIST/JOURNAL=SYS$MANAGER:INCBACKUP/SELECT=`
	`[LYKINS.WORK...]/SINCE=1-JAN-1982`

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